

THE IRON AGE

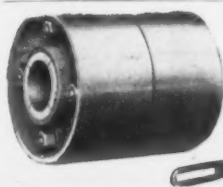
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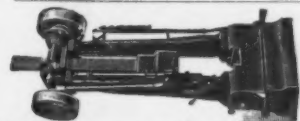
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Ad. on Page 16

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49 CLIFF ST., NEW YORK.

THE IRON AGE

New York, Thursday, May 30, 1907.

The Brown & Sharpe No. 4-B Milling Machine.

A tool designed especially for the heavier class of milling in machine, engine and railroad shops is the new No. 4-B heavy plain milling machine of the Brown & Sharpe Mfg. Company, Providence, R. I. It has been entirely redesigned to meet the unusually severe requirements created by the use of high speed steel cutters, and is much heavier than earlier machines of equal size and capacity. The machine, Fig. 1, is of the constant driving speed type, similar in this respect to other recent milling

for milling equal to that of the main spindle itself, or in other words, capable of carrying any cut within the pulling capacity of the main driving belt.

The drive, from an 18-in. pulley with 6-in. belt, is of a standard Brown & Sharpe type, which was described in *The Iron Age* January 14, 1904. Variable spindle speeds are obtained through hardened gears, the ratios of which vary from zero to 21.3 to 1. The ratio varies inversely as the spindle speed, a high ratio being obtained with

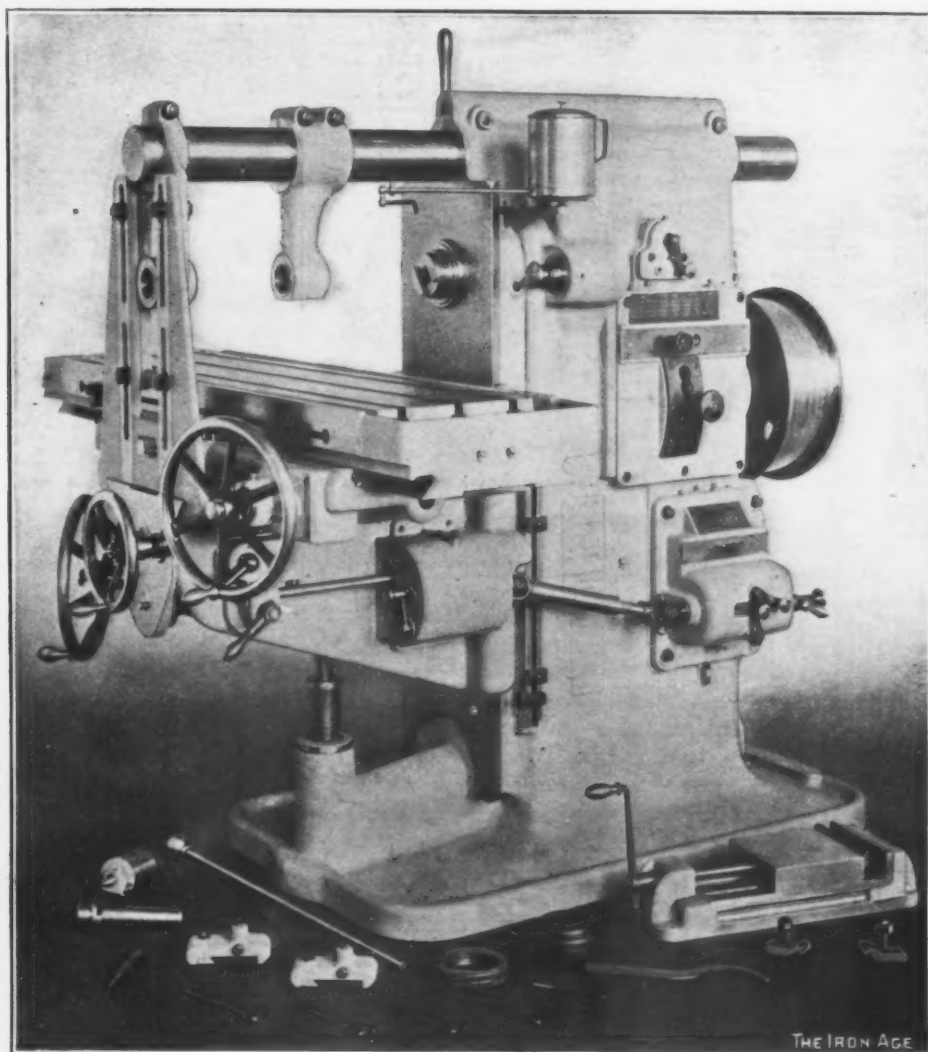


Fig. 1.—The New No. 4-B Heavy Plain Milling Machine Built by the Brown & Sharpe Mfg. Company, Providence, R. I.

machines of the company, and is operated either by belt to a single pulley of large diameter, or by electric motor through silent chain and sprockets. A special feature is the friction clutch pulley with brake, used with electric drive, and, if desired, with belt drive, which does away with the necessity of a countershaft. The table and spindle speeds are independent. The variable feeding mechanism is new and contains interesting and advanced features, which are shown in the detail drawings. All hand wheels controlling the movements of the table are provided with clutches, each operated by a knob in the center of the wheel. The table has quick return and slow hand feed, operated by a single hand wheel at the front of the saddle. A screw feed is employed. A massive vertical milling attachment is furnished, with a capacity

slow speeds adapted to cutters of large diameter. The 16 changes of speed obtainable range from 15 to 350 rev. per min. in geometrical progression and are effected by manipulating the index slide and the levers on the side of the column. The back gears are thrown in and out by a lever in the usual way, and the locking pins engaging the spindle sleeve which replaces the cone pulley are operated automatically by the movement of this lever. In the driving mechanism, as well as in other parts of the machine, no chains or gears are exposed, all mechanism of this character being inclosed in the frame or attached boxes.

The variable feeding mechanism is new in design and gives a wide range of feeds, varying in geometrical progression, that fully covers all regular requirements. For

small mills feeds of from 0.0018 to 0.057 in. per revolution of the spindle are generally used, and for large mills, 0.041 to 1.23 in. The 16 possible changes of feed, otherwise expressed, run from $\frac{5}{8}$ in. to 20 in. per minute. The gears are all of spur form. The drive is direct from the main pulley shaft by chain and sprocket wheels, inside the frame. The table is driven through universal joints and a train of gears in the reverse box on the side of the knee, to the shaft *a*, Fig. 2. On this shaft is splined the

from the hand wheel, giving the quick movement of the table. With the knob pushed in the clutch is engaged with gear *m* and a slow feed is obtained, the motion being transmitted through the reducing gears *l*, *n*, *n* and *m*. The bevel gear *o*, through the pinion *p* and gears *r* and *s*, drives the feed shaft. To disengage the hand wheel when using power feed the clutch *k* is brought to its central position. A spring detent holds the clutch in its different positions. The usual means are also provided for ad-

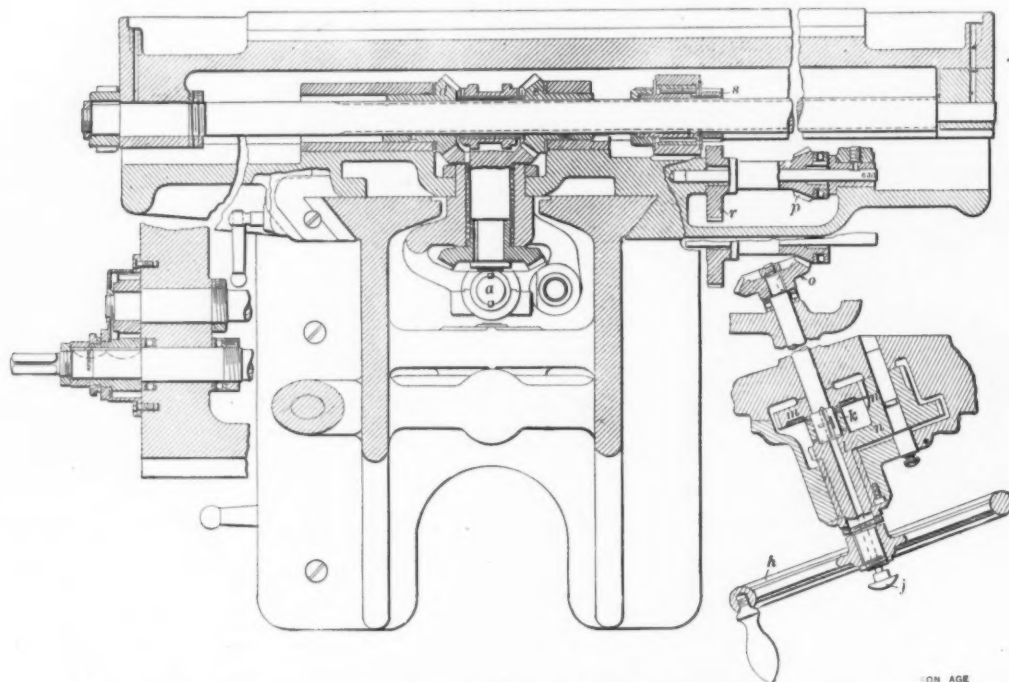


Fig. 2.—Vertical Section through the Table and Knee, with Details of the Table Adjusting Mechanism.

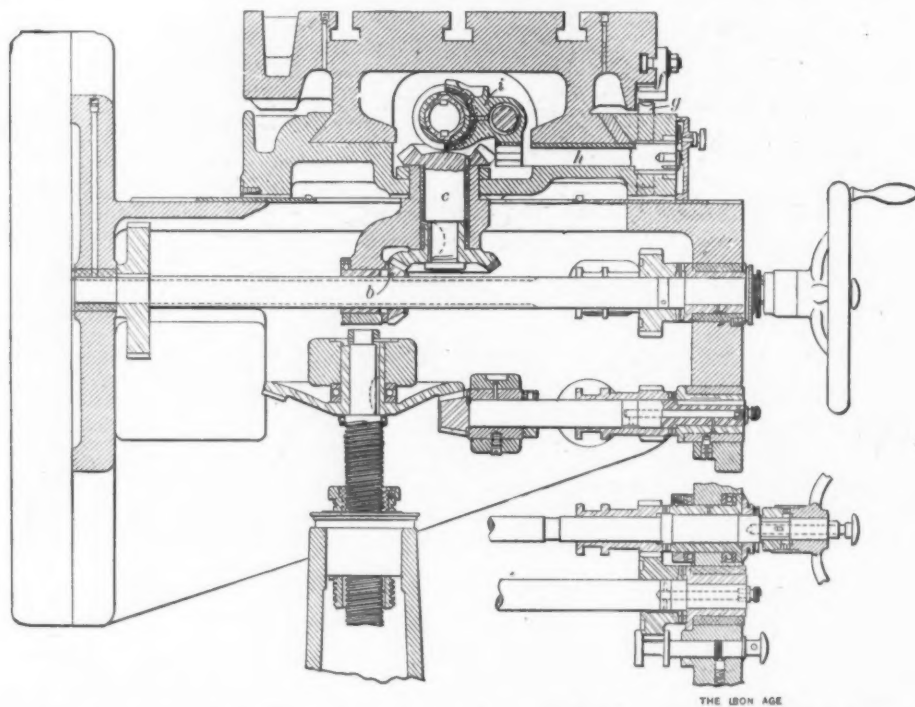


Fig. 3.—Vertical Section through the Table and Knee at Right Angles to That in Fig. 2.

bevel gear *b*, Fig. 3, driving the vertical shaft *c*, which meshes two bevel gears. The latter are mounted loosely upon the table feed shaft. These gears have clutch faces and either one or the other is engaged with the clutch mounted on the shaft, for reversing the feed, which is in addition to the reverse on the side of the knee that affects all the feeds.

The table has quick return and slow hand feed, operated by one hand wheel, *h*, Fig. 2, at the right and front of the saddle. When the knob *j* is pulled out the clutch *k* is engaged with the gear *l* and the shaft drives direct

justing the table in either direction by a crank handle applied to the squared end of the screw at the left end of the table, as shown in Fig. 2.

The automatic trip is actuated by the adjustable dogs *f*, Fig. 3, on the edge of the table, which depress the plunger *g*, rocking the shaft *h* and sliding the clutch shoe *i*. There are two plungers for the two directions of engaging the clutch for feeding to the left or right. It will be noticed that the hand wheels for the longitudinal, transverse and vertical feed shafts are all at the front of the machine, and are convenient when feeding by hand,

as the operator can manipulate them without taking his eyes from the work. As the vertical and longitudinal feed shafts are placed at an angle on the left and right sides of the knee, respectively, the operator has complete control of the various movements of the machine without

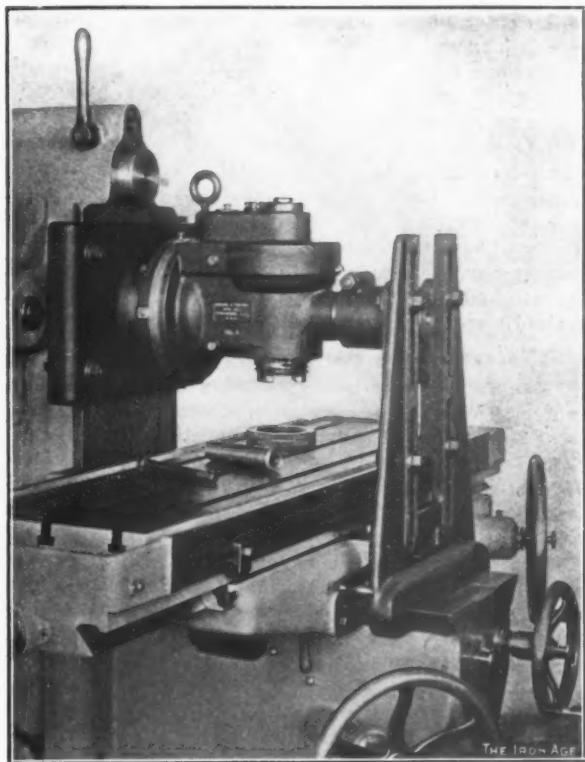


Fig. 4.—The Vertical Spindle Attachment and Manner of Supporting It.

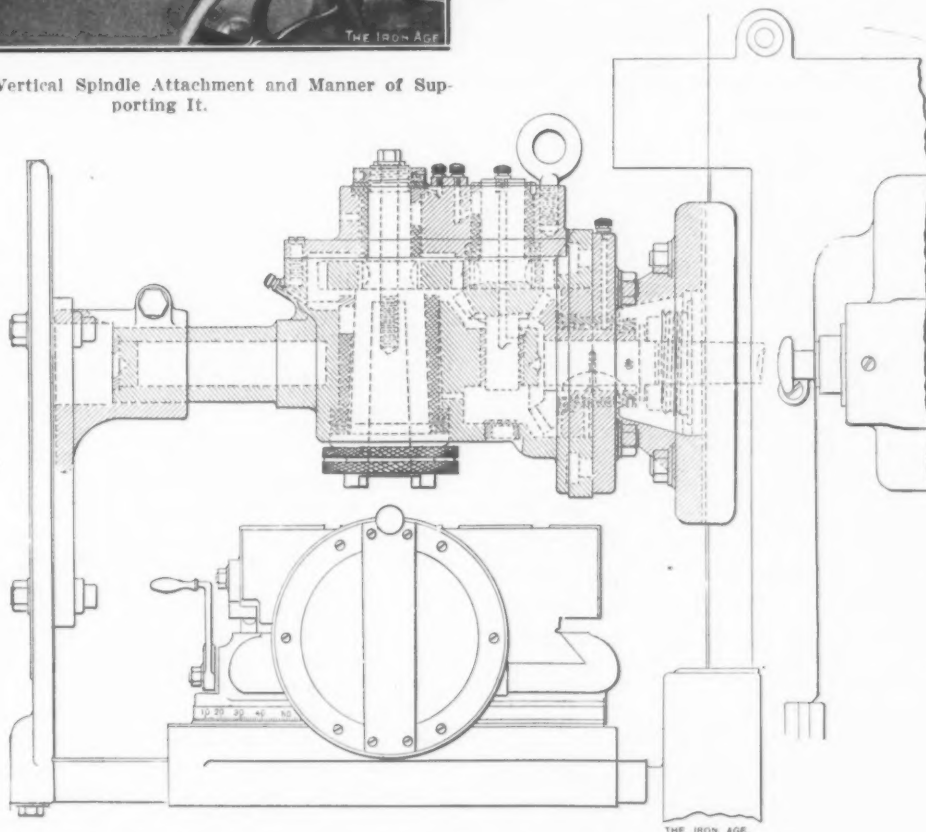


Fig. 5.—Vertical Longitudinal Section of the Vertical Spindle Attachment.

changing his position or removing any handles, and the feeds can be operated simultaneously without interfering with one another. The machine has a longitudinal feed of 42 in., transverse feed of 12 in. and vertical feed of 20 in.

An important new feature of the machine, which is embodied if desired, is a friction pulley, details of which are not shown. This can be substituted for the regular driving pulley, thus adapting the machine to be driven direct from a line shaft and doing away with a counter-shaft, a practice which is being adopted by some as more

economical. The friction clutch operating the pulley is controlled by levers on each side of the machine near the front. On the left side is a long lever, placed for convenience in stopping and starting from in front of the machine. On the right hand side is a shorter lever, answering the same purpose, but intended only for convenience when changing spindle speeds. The clutch is simple in construction, has few parts and is self-adjusting for wear. It operates easily and will drive any cut that the main belt will carry without excessive pressure being applied to the operating lever. The expanding ring is wide and of large diameter, giving ample friction surface. A simple brake is provided which upon the release of the clutch instantly stops the spindle of the machine and acts as an effective lock when removing chucks or cutters from the threaded end of the spindle. A friction pulley of this type is furnished with all motor driven milling machines unless otherwise specified.

The machine is particularly well adapted to the application of motor drive, with either a constant speed or variable speed motor. The single driving shaft feature simplifies the installation of the motor and allows direct drive, by chain and sprockets, from the motor to the machine driving shaft, without need of intermediate gears. A suitable pad is cast on the rear of the machine base to support the motor bracket and allows a motor to be applied at any time, without extensive refitting of the machine. When the constant speed motor is employed the same number of spindle speed changes can be obtained as for the regular belt drive.

With a variable speed motor the spindle gearing is somewhat simpler. The sliding gear on the spindle is retained, and with the back gears gives four series of speeds controlled by levers. With a $7\frac{1}{2}$ -hp. motor (the

size required for the No. 4-B machine) with speed variation of 3 to 1, the following series of speeds are obtained: $9\frac{1}{2}$ to $28\frac{1}{2}$ revolutions per minute; 22 to 66; 51 to 153; and 117 to 351 revolutions per minute. Each of these series will have as many intermediate speeds as there are running points on the controller. With a drive from this type of motor there are obtainable 16 changes of feed for each series of spindle speeds, as follows: 0.033 to 1.04 in. per revolution of spindle; 0.014 to 0.453 in.; 0.006 to 0.194 in.; and 0.0026 to 0.084 in. per revolution of the spindle.

The vertical milling attachment shown in perspective in Fig. 4 and in section in Fig. 5 is proportioned to carry any cut within the milling capacity of the main driving belt. The drive is from the main spindle of the machine, in which a clutch arbor carrying a bevel gear is inserted. The latter, through an intermediate bevel gear mounted upon an auxiliary shaft and spur gears drives the spindle of the attachment as shown. This arrangement allows of a bearing for the attachment spindle almost as large as that of the main spindle. The end of the spindle has the same size taper hole and a thread of same diameter as the machine spindle, allowing the use of the same collets, chucks, face mills, &c., on either the machine or attachment spindles. All bearings are bushed with bronze, all gears are of hardened steel, proportioned to transmit full power of the machine driving belt. The frame of the attachment is clamped direct to the face of the knee slide and has an outer support to insure additional rigidity. The weight of the attachment is 500 lb.

A word should be said about the general design of the No. 4-B plain milling machine. It is heavy throughout, a proper distribution of metal insuring strength, and those parts most subject to strain being amply proportioned to withstand severe service. The spindle has a very rigid support. The knee slide extends to the top of the frame, thus adding to the strength of the spindle bearings and reducing the possibility of any spring in the bearings. The extended knee slide makes it possible to clamp any of the regular attachments to the face of the column so that they become practically a part of the machine. The flat bearings are scraped to surface plates, as a mechanical necessity to insure correct alignments. The box section frame is rigidly braced internally. Bronze bearings are used wherever necessary to insure long wearing qualities of running parts. The weight of the machine is 8200 lb. net.

Production and Consumption of Denatured Alcohol.

WASHINGTON, D. C., May 28, 1907.—The reports of the Internal Revenue Bureau upon the production of denatured alcohol show a small increase for the month of April as compared with March, but the figures, on the whole, are disappointing to those who have anticipated a rapid gain in both production and consumption. The restricted output is attributed, however, to the complicated and somewhat drastic internal revenue regulations, and it will be gratifying to all consumers, present and prospective, to learn that the bureau is now engaged in revising the code along very liberal lines.

Production to May 1.

The output of denatured alcohol in April was 270,206.80 gal., of which 240,787.94 gal. were produced in Illinois and 29,418.86 in Indiana. The production in March was but 240,778.32 gal., but in January it was 574,449.36 gal. The internal revenue reports make the following exhibit for the first four months under the free alcohol law:

	Illinois.	Gallons. Indiana.	Totals.
January	504,299.58	69,189.78	574,449.36
February	261,709.20	34,739.63	296,448.83
March	208,021.21	32,757.11	240,778.32
April	240,787.94	29,418.86	270,206.80
Totals	1,214,816.93	166,125.38	1,381,883.31

It will be noted that the production in January was more than twice as great as in either March or April, but this is due largely to the fact that during the first month under the new law considerable quantities of grain spirits, manufactured prior to January 1, were denatured in anticipation of a heavy demand, which was not fully realized, owing to the restrictions imposed upon dealers and consumers by the internal revenue regulations.

Regulations to Be Liberalized.

The revised regulations will completely revolutionize the present method of distributing denatured alcohol, as they will provide for the enforcement of the supplemental legislation enacted at the last session of Congress. Re-

tailers of completely denatured alcohol will be relieved of the present requirement regarding the keeping of books and the making of periodical returns to the Internal Revenue Bureau. Tank wagons for the local transportation and distribution of alcohol, similar to those now used for petroleum products, will be authorized, and the cost of the container, which now constitutes a heavy ad valorem tax on the product, amounting to several cents per gallon, will be completely eliminated. The present regulations limit the retailer to sales of 5 gal. to any one individual, but under the revised code this limit will be raised to 10 gal. The dealer using a tank wagon will be rated as a wholesaler and will be permitted to distribute alcohol in any quantity to any one desiring to purchase. These changes cannot fail to stimulate the sale of denatured alcohol, as the requirements thus abolished have prevented thousands of applicants for permits to handle denatured spirits from taking advantage thereof, and for some time past more permits have been currently canceled than have been issued.

Movement by Hardware Manufacturers.

Manufacturers of hardware using enamels, lacquers, bronzes, varnishes, &c., are much interested in the movement now on foot to secure a modification in the regulations regarding the use of specially denatured alcohol. Soon after the new law went into force the manufacturers discovered that the use of benzine or pyridine bases as a constituent of completely denatured alcohol retarded the drying quality of enamels, lacquers, varnishes, &c., made therewith, and were reluctantly obliged to abandon the use of this grade of spirits. The Internal Revenue Bureau at once authorized a special denaturant consisting of approximately 5 per cent. of wood alcohol, but applied to all applicants taking advantage of this formula the exceedingly vexatious restrictions placed on all consumers of specially denatured spirits. Manufacturers in the lines referred to have since made a number of elaborate tests and have reached the conclusion that grain spirits denatured with 20 or 25 per cent. of wood alcohol would be available for use if the Internal Revenue Bureau would consent to regard the product as completely denatured and therefore subject to no embarrassing restrictions. Application has therefore been made to the bureau to authorize the proposed formula as a third general denaturant. It is expected that this request will be granted, in which event a very large increase in the consumption of denatured spirits will immediately result.

W. L. C.

The Foundry Specialty Company, Cincinnati, Ohio, has sent out two booklets, one devoted to partine and the other to fluxine. Partine is employed both for parting and for facing. Its use, it is said, permits of reproducing the finest tracing on the surface of the pattern, and saves considerable time in polishing because of the smoothness of the surface of the casting as it comes from the mold. It is employed on large green sand work as well as on smaller patterns, the powder being dusted over the mold. The booklet dealing with fluxine suggests its use for the removal of oxides, silicates and other undesirable elements in the metal. It is employed also in the elimination of gases, preventing the formation of blowholes. Without attacking the crucible or the furnace lining fluxine is designed to clean the metal and make it homogeneous and fluid.

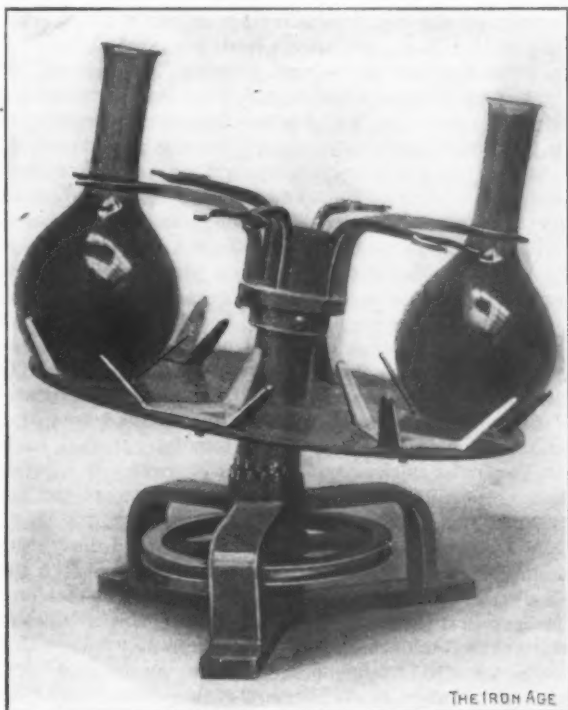
A careful compilation made by the New York *Evening Post* shows that during the last five months—less than half of 1907—the railroads and industrial corporations have issued \$912,849,400 in notes, stock and bonds. Of this total the railroads have borrowed \$792,440,000, stock issues representing \$326,567,400, short-term notes \$285,173,000, and bonds \$180,700,000. The industrial companies have secured \$120,409,000, offering \$63,750,000 in new bonds, \$42,000,000 in notes, and \$14,659,000 in stock. This shows that the railroads have already asked for two-thirds of the \$1,100,000,000 that James J. Hill last November said they would require annually for five years to come if needed improvements and extensions were to be provided.

A New Shaking Device for the Chemical Laboratory.*

BY J. M. CAMP, DUQUESNE STEEL WORKS, PITTSBURGH, PA.

Among the various pieces of apparatus going to make up the equipment of the modern laboratory, it is the purpose of this article to describe the latest appliance in the shape of a shaking device. It was designed and is particularly adapted for the purpose of hastening the precipitation of phosphorous by the well-known and almost exclusively used molybdic acid method, and in the solution of steels or pig irons for the carbon combustion method, but it is equally useful wherever it is desired to agitate a flask for either dissolving or precipitating.

As can be seen from the illustration, it consists of a frame supporting a vertical shaft, which is revolved by a 6-in. grooved pulley. The upper part of the shaft is bent slightly from the perpendicular. Encircling this part is a hub, which in turn supports a flat disk on which the flasks to be shaken are attached. The hub and disk are



The Camp Chemical Agitator.

prevented from turning when the shaft is revolved by teeth on the under side of the hub meshing in corresponding teeth on the top of the supporting frame.

On revolving the shaft the motion of the disk is ideal for the purpose intended and can be best likened to the simultaneous pitching and tossing of the deck of a ship in a tumultuous sea. With each revolution of the shaft a wave travels around the flasks exactly as in hand shaking, and by varying the speed the number and intensity of the wave movements is controlled. To obtain the maximum agitation and still retain the solutions in the flasks, without corking, from 100 to 140 rev. per min. has been found a very satisfactory speed. The disk is made to hold six flasks, any one of which can be placed in or removed from the machine in a fraction of a second. The gripping device is movable, up or down, enabling it to be quickly adjusted to hold any size flask, from a 6-oz. to a 24-oz. Florence or Erlenmeyer. The electrical power required to operate it is 0.12 ampere on 250 volts, or about the equivalent of 1-25 hp., less than the average desk fan motor consumes. With a countershaft to give the

desired number of revolutions, any source of power may be used.

Heat can be applied to the apparatus if desired by means of a circular burner, but it has been found that by adding the liquid hot to the flask, or heating the contents before placing the flask in the machine, the same end is obtained.

The advantages of the machine over hand shaking are obvious. Not only is the operator relieved of the physical effort, but during the time of shaking he can be doing other work, with the assurance that the machine is not shirking, which might result in false analysis. Then, in phosphorous precipitation, for instance, the action of the machine being constant, a precipitate of like crystallization is always obtained, aiding materially its estimation by judging its bulk, as is the practice in most busy open hearth steel works laboratories.

The machine is simple, easy to operate, quiet, and the flasks can be readily placed in and removed from the apparatus. The fact that the flasks do not need to be corked is also an advantage. Application has been made and the claims granted for a patent covering the ideas embodied in this machine, and it is the purpose to put it on the market as soon as suitable arrangements can be made.

A New Power Station at Niagara.

The Niagara Falls Hydraulic Power & Mfg. Company is now completing what may be the last great power station erected on the New York side of the river at Niagara in some years. This station is known as No. 3 and is located at the water's edge in the gorge. The unit of development will be 10,000 hp. Two of the units are now in place and two others are well along in construction. The first section of the station will have five units and the ultimate capacity of the installation is to be about 100,000 hp. It is from this station that the company contemplates supplying the Aluminum Company of America with electric power for the operation of its mammoth new works, now approaching completion. This new aluminum works, the largest in America, if not in the world, is located on top of the high bank north of the flour mill section on the lands of the Niagara Falls Hydraulic Power & Mfg. Company. It is being built of steel and concrete and is one of the most substantial structures erected in Niagara Falls for manufacturing purposes. Located, as it is, along the edge of the high bank, with the tracks of the New York Central Railroad on the east, the rail facilities for the receipt of raw material and the shipment of the finished product will be quite ideal. The power company is prepared to supply power as soon as the aluminum company is ready to receive it. The Aluminum Company of America will receive 37,000 hp. from the station.

Secretary Taft has approved of the water diversion, as the amount that will be used by the company comes well within the limit established by the Burton bill. It is noticeable that the power company is doing its utmost to have all features of its construction work, both above and below the bank, come well within the effort to beautify Niagara and this power section. Thousands of dollars of expense are being incurred by the Niagara Falls Hydraulic Power & Mfg. Company in order that it may conform to the efforts to keep the industrial development in harmony with the scenic features.

The Morgan Spring Company's works at Struthers, Ohio, has made a new high record on its Morgan continuous wire rod rolling mill. On May 20 the mill in a single turn of 12 hr. rolled 101.6 gross tons of No. 5 standard gauge soft Bessemer wire rods in coils. In these days, when there is so much interest among rollers to beat their past records, this achievement in the company's single strand mill for a single turn is, of course, a source of much gratification to all the interested parties.

* Abstract of a paper read at a joint meeting of the American Chemical Society and the Chemical Section of the Engineers' Society at the Carnegie Technical Schools, Duquesne, Pa., May 23, 1907.

THE FOUNDRYMEN'S CONVENTION.

An Association Formed by Brass Interests.—A Record Attendance.

The convention of the American Foundrymen's Association, at Philadelphia, May 21, 22 and 23, of which the first day's session was reported in the last issue of *The Iron Age*, broke all records in attendance. At noon of Thursday, the last day of the convention, 1391 persons had registered. This compares with 800 at the Cleveland convention and with registrations of from 200 to 500 at conventions in years preceding 1906. Apart from the unprecedented attendance and the remarkable exhibition of foundry machinery and appliances, the convention was made noteworthy by the organization of the American Brass Founders' Association. The interest taken by the brass trade in the new organization indicates that in this important field the possibilities of such advance in economies of operation as has resulted from the work of the iron founders' association is well appreciated.

The absorbing attractions of the exhibition carried on at the Second Regiment Armory under the auspices of the Foundry Supply Association may have lessened the attendance at the sessions for the discussion of papers. But there was a great compensating value in the exhibits, since these gave opportunity for seeing practically every form of foundry device in actual operation. Moreover, it is to be questioned if the foundrymen are less remiss in attending the sessions at which papers are discussed than are the members of the average society of engineers.

TUESDAY AFTERNOON.

Brief mention was made in our report of last week of the papers read at the Tuesday afternoon session of the convention. The paper of E. B. Gilmour, Elizabethtown, Pa., on "The Evolution of the Foundry Business," paid particular attention to the gravity molding machine of the Mitchell-Parks Mfg. Company, St. Louis, which was described in *The Iron Age* of January 10, 1907, p. 130. The speaker said that the basis of the new method was the fact that the most intricate kind of ramming is done by riddling the sand and throwing it into the intricate parts of the mold. The gear wheel was cited as an example of a mold that can never be rammed successfully in the teeth with a rammer. The gravity principle has now been applied to every part of the mold by the gravity molding machine. Another feature of the machine is that a special flask can be adopted the full size of the machine and any number of sections can be put together to get a required depth. In brief, by the gravity mold flasks are rammed by a succession of pressed bodies of sand falling and wedging opposite each other until a layer is formed across the entire area of the flask. Additional layers are then built up in the same manner until the entire mold is formed in a solid mass of sand of the same degree of firmness throughout.

In the discussion of the paper of H. M. Lane on "Small Things Often Neglected in the Core Room," the question of circulation of air in core ovens came up. The speaker made the point that the heat efficiency of core ovens could be greatly increased if the waste heat of the oven were used for partly drying the cores. This has been done in some foundries, the truck of cores being run into one oven where they are dried and then into another where they are baked. Care is necessary in this connection that no attempt be made to dry cores beyond the point where the hot air escaping from the oven is saturated with moisture. The air should be dried before it goes into the core oven if possible. The proper temperature of the core oven depends on the binder used in making cores and varies from 350 to 550 degrees F.

Henry B. Cutter, Seneca Falls, N. Y., told of some experiments with a condenser in the core oven. The condenser consisted of a coil of pipe through which cold water was passed. Such a condenser was put on one side of a core oven and it was found that the results in baking cores were not so good on the opposite side of the oven. Thereupon the circulation of air in the oven was increased. The fuel cost was cut from 25 to 40 per cent.

This was done last fall, the tests being suspended when cold weather came on. The undetermined question was whether the better circulation or the action of the condenser or both caused the reduction in the fuel bill. Mr. Cutter was asked to continue his experiments and bring in the results at the next convention.

WEDNESDAY FORENOON.

A meeting of brass foundry interests to consider the advisability of forming an association of their own was scheduled for Wednesday morning. It was presided over by Charles J. Caley, New Britain, Conn., who made a brief address on the purposes of the promoters of the new organization and in answering the question who are eligible to membership he mentioned brass foundrymen, rolling mill firms, platers, supply men, electric workers, and those identified with the automobile industry.—In fact, any one directly or indirectly connected with the working of the nonferrous metals or their alloys. The speaker said that great things have been accomplished in the brass foundry in the past 20 years. The oil melting furnace has become a factor and is making rapid strides, though its field has been limited thus far to heavy castings. It has been unable to replace the pit furnace for light castings, plain and ornamental, as used in builders' hardware, saddlery, &c. The molding machine has not met with as much success in the brass foundry as it should, owing in part to the character of the work and the cost of making and maintaining patterns. The inventor has a problem here in designing a machine in which a standard frame may be used, the frame to be so arranged that by a simple method any gated or loose patterns may be attached quickly and accurately. The speaker knew of a dozen firms with thousands of patterns in their vaults who would be only too glad to install molding machines in their brass foundries if they could obtain results without going to the expense of regating their patterns as is necessary with the present molding machines.

Mr. Caley said further: "Handling as I have been hundreds of tons of brass and bronze wrought metal, and knowing the difficulties I have, due to defects in metal, I believe that the rolling mills have their own troubles as well as the foundrymen, and I believe in many ways they can be benefited by membership in our association. The automobile interests claim more than passing notice, on account of the many intricate castings employed—castings that must be accurate and so constructed that they will stand the tensional and torsional strain to which they are subjected. To accomplish the results desired, it is necessary that the foundryman making such castings have in his employ men with a thorough knowledge of the foundry business and its requirements, men familiar with coremaking as well as the mixing and melting of metals required in automobile work. Plumbing and steam fitting interests certainly come in for their share of our attention, as they have made wonderful strides in the past 20 years, when we consider the old fashioned closed plumbing and the up-to-date open plumbing, the making of which has caused a revolution in the art of making light, durable castings. The same is true of steam fitting, as many of the valves of to-day are cored, where years ago they were bored. Steam pressure has been raised without showing any bad effect, which would go to prove that an advance had been made in the mixture of metals to the extent that the cored valve of to-day is lighter by one-third than the valve of years ago."

Mr. Caley was followed by Paul Kreuzpointner, Pennsylvania Railroad, Altoona, Pa.; Hugh McPhee, Bridgeport, Conn.; Edro Richardson, Baltimore, Md.; W. H. Parry, Brooklyn, N. Y.; J. M. Gamble, Kewanee, Ill.; J. H. Sheeler, Philadelphia; Charles Thomann, Crosby Steam Gauge & Valve Company, Boston, and Messrs. Thompson of Bridgeport, Conn., G. W. Wright of Reading, Pa., and Bellows. All were of the opinion that an association

devoted to brass foundry and kindred interests would have an important field of endeavor and would result in great good to all connected with these industries. The study of brass mixtures, it was said, would prove an important line of inquiry for the new association. The preparation of molds, particularly the gating of molds, and the pouring of the metal at proper temperatures are all matters which might be investigated and discussed with profit. The outcome of the discussion was the decision to proceed to the formation of a brass founders' association, and committees on Constitution and By-Laws and on Nomination of Officers were announced as given in *The Iron Age* of May 23. Papers were read by Andrew M. Fairlie, Copper Hill, Tenn., on "Science Applied to the Brass Industry," and by Charles H. Proctor, Arlington, N. J., on "Electro Deposition of Brass." The papers of Walter B. Snow, Hyde Park, Mass., "A Plea for Healthful Conditions in the Brass Foundry"; of C. E. Johnson, Dorchester, Mass., "Notes on Brass Castings"; F. L. Antisell, Perth Amboy, N. J., "Copper for the Brass Foundry," and William H. Parry, Brooklyn, N. Y., "A Few Denatured Brass Foundry Notes," were read by title.

In his paper entitled "A Plea for Healthful Conditions in the Brass Foundry" Walter B. Snow of the B. F. Sturtevant Company, Hyde Park, Mass., called attention to the constant irritation of mucous surfaces to which workers in brass industries were subjected, the dust of corundum and emery being peculiarly irritating. He showed that mechanical means are absolutely necessary to maintain a rapid air change and insure the proper removal of dust. The fan blower has been employed to secure these results, its action being positive and of sufficient intensity to create an ample movement of air. When warranted by the size of the plant the fan may form part of a blower heating system by means of which warm air from a central heater is delivered under pressure through pipes to all parts of the building. The paper was accompanied by views showing the proper arrangement of hoods for upward exhaust in connection with emery wheels; an arrangement for the carrying of pipes beneath the floor; also special hoods designed to give freedom to workmen in grinding departments, as well as a buffing lathe with special form of trap hoods.

WEDNESDAY AFTERNOON.

The Work of Foundry Trade Schools.

W. W. McCarter, Marietta, Ga., was the first speaker at the afternoon session. Without reading his paper, entitled "Some Facts Concerning Trade Schools," he told briefly of the foundry school he is operating on a commercial basis, the only school of the kind in this country so far as he was informed. There are twenty students at present, divided into three classes. The seniors are producers; the juniors "semi-producers," performing the part of helpers and participating in ramming and drawing of patterns, while the freshmen line up ladles, charge the cupola and make cores, following up the two higher classes. Wages range from 40 cents to \$2 a day and the pay increases according to the earning power, regardless of the time the student has served. The ages of the present students are from 12 to 31 years. The school has been in existence over a year, and, according to the speaker, is prospering. As indicating the work done the following items of a two days' heat, March 11 and 12, 1907, were given:

- Six wind boxes for the Tennessee Copper Company.
- Two screw frames for gang saws, movable worm.
- Forty journal bearings for marble trucks.
- Nine 20-in. driving wheel centers for locomotives.
- Five 22-in. driving wheel centers for locomotives.
- One 40-in. driving wheel center for locomotives.
- Two sections, troughs, for rubbing bed.
- One large sand pump base.
- One friction flange for hoisting engine.
- Twelve driving boxes for 8 x 14 in. locomotives.
- Four steam chests.
- Four covers for rubbing bed troughs.
- Five valves for steam brake.
- One pedestal for sand pump.

In addition to the items enumerated, two 8-in. x 14-in. locomotive cylinders were molded and placed in the core oven subsequently cored up and cast the following heat.

The result of the heats referred to was as follows: Good castings, 8940 lb.; bad casting, 60 lb.; remelt, 600 lb. Total, 9600 lb. The total iron melted was 10,186 lb.; melting loss, 586 lb.; coke ratio, 1 to 8. The entire cost of labor for the two days was \$47.10.

T. R. Coggeshall, superintendent of the mechanical school of Girard College, Philadelphia, invited the members of the association to visit the foundry of that institution. He referred also to the blacksmith shop, plumbing department and other industrial features of the training given at Girard College. Mr. Coggeshall was accompanied by a dozen of his students who were well received by the convention.

Prof. William C. Stimpson made use of lantern slides in giving an account of the training in foundry work at Pratt Institute, Brooklyn, N. Y. The Pratt school is not a true trade school and does not attempt to turn out journeymen mechanics. On the other hand it is quite removed from the engineering schools of college grade. The aim is to give instruction which will prepare men to rise to the positions of master mechanic, foreman or assistant superintendent after they have had sufficient practical experience. Pratt Institute is now carrying on work in 60 courses in which altogether there is an enrollment of between 3600 and 3700 students drawn from nearly every State in the Union. The time devoted to foundry work is limited. The whole course in steam and machine design, as the mechanical course is known, requires two years. The speaker went into details as to the methods of foundry instruction and gave views of the foundry and the various operations therein, also of a group of small castings which had been turned out. In the school year of 1905-6 23 heats had been poured in the foundry. The total weight of iron charged was 27,800 lb. and the loss of metal was 10 per cent. The total weight of good castings was 15,400 lb. and of poor castings 1500 lb. In the school year 1906-7 up to April 1, 15 heats had been poured. The total weight of iron charged was 19,700 lb. and the loss of metal was 8 per cent. of the iron charged. The total weight of good castings was 11,300 lb. and of poor castings 1000 lb. Practically none of the labor saving machinery found in modern shops is used. The men are in the foundry school but a short time and the desire is to help them acquire as much skill in molding as possible and some insight into practical foundry conditions. The speaker believed that all the instruction given in pattern making, forging and machine work, to say nothing of mechanical drafting, mathematics, practical mechanics and power plant operation is of great value. He questioned if a single one of these subjects would be omitted if a foundry course were being planned.

E. A. Johnson, who has charge of the foundry school of the Winona Technical School, Indianapolis, told of the work carried on there and illustrated his talk with lantern slide views of the foundry operations of various castings turned out. Starting last year with two boys the foundry school had now upward of 20 students enrolled.

H. F. J. Porter, New York, spoke briefly on "Industrial Betterment," and presented a number of lantern slides illustrating progress made in the improvement of shop conditions in the various industries in all parts of the country. Mr. Porter's paper on "Cost Accounts," also scheduled for the Wednesday afternoon session, was read by title.

J. S. Sterling, Wilmington, Del., in the absence of H. D. Miles, Buffalo, presented a form of blank recommended by the Jobbing Founders' Association and prepared by the Costs Committee of that association. The form submitted is for the proper keeping of the items of cost of work passing through the shop. It was presented originally at a meeting of the Pittsburgh Foundrymen's Association, as already reported in these columns.

A paper on "Sandless Castings," by John H. Shaw, New Haven, Conn., was read by Van Buren Lamb, Keystone Brake Shoe Company, New York. The company represented by the latter employs iron molds in the production of brake shoes. A specimen mold was shown by Mr. Lamb.

The Universal Molding Machine.

The concluding paper of the afternoon was that of E. Rouceray, Paris, France, on "The Universal System of Machine Molding." The universal machine is so called because the same machine does both flat and intricate work. It is for the latter that the machine is particularly intended, and molds are made with or without the use of stripping plates. The saving on hand molding increases with the intricacy of the castings. The basic idea of the universal system is the making of pattern plates in the foundry without help from the machine shop. M. Rouceray's paper will be presented in an early issue of *The Iron Age*. The lantern slides given in connection with it and the cinematograph views were an exceedingly clever and interesting feature. They gave a particularly vivid idea of the rapidity with which work is done on the universal machine, particularly with the swinging machine when equipped with an automatic sand distributor. One thing about the work illustrated was the extensive use of loose parts on stripping plates which is possible with the universal machine. The molding of intricate castings, as for example, aluminum work for automobiles, is one of the surprising achievements illustrated. In connection with one of his cinematograph views the speaker, after a particularly rapid piece of mold making had been finished, introduced a moving picture of a molder, who, viewing the performance of the machine, threw away his tools and bowed himself out as thereafter a superfluous foundry factor.

THURSDAY MORNING.

Those interested in the proposed organization of the brass foundry interests occupied the assembly room at the Second Regiment Armory for the first session of Thursday morning. The committee appointed on Tuesday with Dr. Moldenke as chairman reported a constitution and by-laws patterned very closely after those of the American Foundrymen's Association. It was decided to call the new organization the American Brass Founders' Association. This met with some objection from the aluminum and other interests, but the difficulty of finding a name which would be all inclusive was appreciated, as well as the fact that the brass foundries had been the important factor in the promotion of the new association. It was explained that the intention was to bring into this association all industries whose products are made from the nonferrous metals. Those eligible to membership are not only proprietors, superintendents and foremen of brass foundries, but also all connected with aluminum, copper and other works employing sheet metal, wire or other forms of such metals apart from castings. Electroplating interests are also included.

Officers of the American Brass Founders' Association.

The Committee on Nomination of Officers reported the following list of officers and the persons named were elected:

President, Charles J. Caley, Russell & Erwin Mfg. Company, New Britain, Conn.

Vice-Presidents: New England—W. R. Webster, Bridgeport Brass Company, Bridgeport, Conn., and W. S. Allen, Yale & Towne Mfg. Company, Stamford, Conn. New York and New Jersey—A. Bate, Nathan Mfg. Company, New York. Pennsylvania, Maryland and Delaware—G. W. Wright, Reading Hardware Company, Reading, Pa. Central States—William M. Corse, Detroit Lubricator Company, Detroit. Western States—J. N. Gamble, Western Tube Company, Kewanee, Ill. Southern States—Edro Richardson, Edro Richardson Brass Company, Baltimore, Md.

Secretary, Andrew M. Fairlie, Tennessee Copper Company, Copper Hill, Tenn.

Treasurer, J. H. Sheeler, Sheeler-Hemsher Company, Philadelphia.

It was stated that the new association would bear a co-operative relation to the American Foundrymen's Association and would hold its annual conventions at the same time and place.

Business Session of the Iron Founders.

The final session of the American Foundrymen's Association followed immediately the meeting of the brass

founders. It was announced with regret that President McFadden had met with an accident, his collar bone having been fractured in a fall. Vice-President Caley was therefore asked to preside. The report of the Committee on Nomination of Officers was presented by the chairman, J. S. Seaman, Pittsburgh, and was adopted unanimously. The new officers are as follows:

President, Stanley G. Flagg, Jr., Stanley G. Flagg & Co., Philadelphia.

Vice-Presidents: First District—C. J. Caley, Russell & Erwin Mfg. Company, New Britain, Conn.; Second District—John W. Burr, Burr & Houston Company, Brooklyn, N. Y.; Third District—H. E. Field, Mackintosh, Hemphill & Co., Pittsburgh; Fourth District—J. H. Whiting, Whiting Foundry Equipment Company, Chicago, Ill.; Fifth District—A. K. Beckwith, Estate of P. D. Beckwith, Dowagiac, Mich.; Sixth District—Thomas W. Sheriffs, Sheriffs Mfg. Company, Milwaukee, Wis.; Seventh District—J. P. Golden, Golden's Foundry & Machine Company, Columbus, Ga.; Eighth District—L. L. Anthes, Toronto Foundry Company, Ltd., Toronto, Canada.

Secretary and treasurer—Dr. Richard Moldenke, Watschung, N. J.

On motion of Mr. Seaman, the retiring president, W. H. McFadden, was made an honorary member of the Association. Like recognition was given to the secretary, Dr. Moldenke, whose splendid work in behalf of the association was referred to appropriately by Mr. Seaman.

The Convention of 1908.

Secretary Moldenke reported that on behalf of the Canadian Manufacturers' Association, the foundrymen of Toronto and the government of that city, an invitation was extended to hold the convention of 1908 in Toronto. The convention of 1909, the secretary added, had already been bespoken by the foundrymen of Cincinnati. The question arose in connection with the Toronto proposal whether the exhibits of the members of the Foundry Supply Association could be set up at Toronto without involving complications as to customs duties. L. L. Anthes, Toronto, said that that question had been considered and that the member of the Cabinet with whom Toronto foundrymen had communicated had replied that there would be no difficulty on the score of duties. The procedure would be to make the exhibition hall temporarily a bonded warehouse, putting an officer in charge and checking out the various exhibits as they were sent across the border after the meeting. Mr. Anthes told of the growing interest in the American Foundrymen's Association on the Canadian side of the line. Whereas a few years ago only one or two foundrymen from Canada attended these meetings, there were 10 or a dozen at the Cleveland meeting last year, and at the present convention the roll of Canadian foundrymen and guests numbered fully 100.

On behalf of the Mayor of Niagara Falls, N. Y., and of the Bureau of Publicity of that city, its secretary, Guy C. Bennett, extended an invitation to hold the convention and exhibits at that point. This brought up the proposal to have a two days' session of the Foundrymen's Association at Toronto, and then have the entire gathering proceed to Niagara Falls to spend a day or two among the exhibits, in case the Foundry Supply Association should decide to have the exhibition there. There was some objection to the separation of the convention and the exhibits. However, the determination of the matter is in the hands of the respective executive committees of the two organizations.

The convention adjourned after thanks had been voted to the Philadelphia foundrymen and all who had had to do with the entertainment of the visitors, to the secretary of the association, and to those who had prepared papers.

The Foundry Supply Association.

A meeting of the Foundry Supply Association was held on Friday morning, in the assembly room of the armory. President S. T. Johnston thanked the members for their co-operation during the year, and referred to the rapid growth of the association and the success it had had, the membership having reached 99 in the first

year. The report of the secretary, H. M. Lane, told of the inception of the Foundry Supply Association in the temporary organization known as the A. F. A. Exhibit Association, which had charge of an exhibit of foundry equipment in connection with the American Foundrymen's Association convention in Cleveland in 1906. The meetings and acts of the Executive Committee in the past year were referred to in the report and a financial statement was given. The total receipts were \$5948.50, in addition to which there was due from members \$1445, making a total of \$7393.50. The expenses of the exhibit would approximate \$6500. The treasurer's report was read, and it was stated that a balance of between \$1000 and \$2000 would be left after the expenses of the present convention were paid.

The Committee on Nomination of Officers reported the following list and the persons named were elected unanimously:

President, E. H. Mumford, E. H. Mumford Company, Philadelphia.

Vice-Presidents: W. P. Shepard, Rogers, Brown & Co., Buffalo; W. S. Quigley, Rockwell Engineering Company, New York; H. R. Atwater, Osborn Mfg. Company, Cleveland; William Chamberlain, Garden City Sand Company, Chicago.

Treasurer, J. S. McCormick, J. S. McCormick Company, Pittsburgh.

Secretary, H. M. Lane, Cleveland.

Trustees: U. E. Kanavel, Interstate Sand Company, Cleveland; E. J. Woodison, Detroit Foundry Supply Company, Detroit; W. J. Thompson, Hamilton Facing Mill Company, Hamilton, Ont.; F. W. Perkins, Arcade Mfg. Company, Freeport, Ill.; George Rayner, Carborundum Company, Niagara Falls. The first three serve for three years, Mr. Perkins for two years, and Mr. Rayner for one year.

The constitution was amended increasing the number of vice-presidents from two to four and the number of trustees from six to nine. The salary of the secretary was increased from \$500 to \$1000.

Invitations were extended on behalf of Toronto, Ont., and Niagara Falls, N. Y., for the exhibit of 1908. The decision rests with the Executive Committee, in conjunction with the Executive Committee of the American Foundrymen's Association. The sentiment in both associations, it was stated, favors holding both the convention and the exhibit at Toronto.

Entertainment.

As in 1896, at the meeting at which the American Foundrymen's Association was organized, the Philadelphia hosts proved rare entertainers. Emphasis was laid in the invitation on the desire of the Philadelphia members to have a large representation of ladies among the visitors. A special committee was provided for the entertainment of the ladies. A theater party and carriage rides to various points of interest had been arranged, the whole programme culminating in a trip to Atlantic City on Thursday. About 200 members of the association elected to take this latter trip in company with the ladies.

Apart from the smoker and vaudeville performance of Tuesday evening, the feature in the way of entertainment was a trip on the Delaware on Thursday afternoon, with Washington Park as the objective point. The party consisted of several hundred members and guests who took the steamer at the foot of Arch street. After a run up the river for the rapid inspection of a number of plants, the steamer headed down stream. The first stop was at Kaighn Point, the location of the Otto Hoffman by-product coke plant of the Camden Coke Company. There are now at Kaighn Point 150 ovens, the original plant having been increased by 50 ovens in May, 1906. The daily consumption of coal is 950 tons, and the daily production of coke 625 tons. The average coking time is 30 hr. The charge of coal per oven is 7 tons, and the production of coke per oven is 5 tons per charge. About 300 men are employed.

A pleasant feature of the trip down the river was the presentation of a diamond ring to F. C. Everitt, the efficient secretary of the Associated Foundry Foremen.

The speech of presentation was made by W. O. Steele, Grenloch, N. J. At Washington Park the excursionists witnessed a shad haul, and later were given an elaborate shad dinner.

Trips to foundries in Philadelphia were arranged for by the local committee, guides being furnished the various parties. The plants visited included those of the Link Belt Company, Niles-Bement-Pond Company, Enterprise Mfg. Company, Camden Iron Works, Thomas Devlin Mfg. Company, Eynon-Evans Mfg. Company, Wm. Sellers & Co., Incorporated, Abram Cox Stove Company, the crucible plant of R. B. Seidel, Incorporated, and the supply warehouses of the J. W. Paxson Company. A party was also taken to the engineering laboratory of the University of Pennsylvania, and another to the Seaboard Steel Casting Company's foundry at Chester, Pa.

THE EXHIBITS.

The exposition of foundry machinery and supplies showed a marked advance over that accompanying the Cleveland convention of 1906, great as that was. Seventy firms had space, as against 40 at Cleveland. The demonstrations, particularly of molding machine operation, attracted interested groups of foundry proprietors, superintendents and foremen, and in scores of cases attendants upon the convention made the trip to Philadelphia expressly to decide what equipment to purchase after seeing the demonstrations of competing devices side by side. Both alternating and direct electric current was provided, as well as air at 80 lb. pressure, a number of pneumatic devices being in operation. In addition to the Second Regiment Armory floor a tent 84 x 150 ft. was pitched on ground adjoining the armory, so great was the demand for space. The firms exhibiting and the equipment and supplies shown are catalogued in the following list, the spaces being taken in order, beginning at the registration desk and official headquarters:

SECOND REGIMENT ARMORY.

- Tabor Mfg. Company, Philadelphia, Pa.: A 24-in. hinge molding machine with hand draft, a 24-in. hinge machine with 7-in. hand draft and with equalizer, a 14 x 16 in. split pattern molding machine, 10, 13, and 16 in. power ramming machines, and a 36-in. Taylor-Newbold inserted tooth cold saw.
- J. S. McCormick Company, Pittsburgh, Pa.: Sand mixer, capacity, 4 to 8 tons per hour. Farwell universal molding machine, Reid molding machine, Twentieth Century molding machine, adjustable crucible tongs.
- The B. F. Sturtevant Company, Boston, Mass.: A 7½-kw. generating set, 30-in. propeller fan, No. 3 monogram exhaust fan, No. 9 steel pressure blower, working model of a high pressure blower, 30-in. steel plate mill exhaust fan, No. 9 direct connected high pressure blower, 18-in. disk fan, blast gates and other apparatus.
- Hanna Engineering Works, Chicago, Ill., and Thomas W. Pangborn, Eastern agents, New York City: Foundry specialties, including Hammer core machine, pneumatic punches and riveters, air, steam and electrically driven sand shakers, Pangborn sand blast machine, molding sands, plate products, &c.
- Arcade Mfg. Company, Freeport, Ill.: Two No. 1 and one No. 2 Modern molding machines of the rockover type, with a large assortment of castings molded on these machines.
- Edward Brown & Son, Philadelphia, Pa.: Pyrometers.
- R. B. Seidel, Inc., Philadelphia, Pa.: Plumbago crucibles for melting all kinds of metals, special shapes, &c.
- Diamond Clamp & Flask Company, Richmond, Ind.: Core making machines, belt shifters and quarter angle couplings.
- E. Harrington & Son Company, Inc., Philadelphia, Pa.: Various styles of hand holsts.
- S. Obermayer Company, Cincinnati, Ohio, and Whiting Foundry Company, Harvey, Ill.: Booth elaborately arranged as a headquarters for their friends, with provision for resting; also a large display of photographs in connection with equipment manufactured by these concerns.
- Northern Engineering Works, Detroit, Mich., and New England Engineering & Equipment Company, Boston, Mass.: Foundry ladles, electric and pneumatic cranes and holsts, Newton cupola, &c.
- W. W. Sly Mfg. Company, Cleveland, Ohio: Core sand clearer, dust arrester, resin grinders, and system of exhaust tumbling barrels.
- C. E. Mills Oil Company, Syracuse, N. Y.: Core compound, both liquid and dry.
- J. W. Paxson Company, Philadelphia, Pa.: Ladies, rockover molding machine, sand blast outfit, centrifugal sand mixer, bellows, brushes, sieves, foundry sands, wire cutters, Colliat cupola, blowers, Partamol, Barnett's brass molders' flasks, S. H. forced draft brass furnaces, pneumatic sand sifters, tumbling barrels, sprue cutters, Millett core oven, universal trimmers, Wadsworth core machine, Holland core oil, cupola

- breast and runners, facings, Outerbridge silicon alloy, Jorgansen clamps, molders' tools, Kirk's chemicals, core compound, hay rope, Sawyer magnetic separator, Fairbanks' standard scales.
- C. Drucklieb, New York City: Injector sand blast apparatus.
- Cleveland Wire Spring Company, Cleveland, Ohio: Steel foundry barrels and boxes.
- Osborne Mfg. Company, Cleveland, Ohio: Foundry supplies of all descriptions, brushes, brooms, shovels, riddles, &c.
- Yale & Towne Mfg. Company, New York City: Triplex hoists, hand and electric.
- Wilbraham Green Blower Company, Philadelphia, Pa.: Electrically driven positive pressure blower.
- Pettinos Brothers, Bethlehem, Pa.: Ceylon, American and Mexican graphites, sands, gravels, clays, talcs, and facings.
- J. D. Smith Foundry Supply Company, Cleveland, Ohio: Water tumbling barrels, sprue cutting machines, long bearing emery grinders, brass furnaces, aluminum melting furnaces, core oven car, ball bearing turn tables, core oven, pneumatic sand sifter, Cleveland hoist molding machine.
- Berkshire Mfg. Company, Cleveland, Ohio: Two standard size Berkshire molding machines in operation, sand elevators, revolving screens, flasks, &c.
- Addressograph Company, New York City: Display of rapid addressing machines.
- Keystone Grease Company, Philadelphia, Pa.: Greases and lubricants for all classes of machinery.
- MacPhail Flask & Machinery Company, Chicago, Ill.: Taper snap flasks and jackets, steel bottom boards, &c.
- Gunn, Richards & Co., New York and Montreal, Canada: Cost systems, &c.
- J. L. Taylor Mfg. Company, Bloomfield, N. J.: Quick adjusting and self locking clamps.
- Library Bureau, New York City: Systematizing methods.
- Arthur E. Rendle, New York City: Paradigm skylights, fire-proof windows, side lights.
- Wm. Cramp Ship & Engine Building Company, Philadelphia, Pa.: Parsons' white brass and manganese bronze, display of castings and ingot metals.
- Stanley Doggett, New York City: Exhibit of Perfection parting, charcoal and soapstone facings.
- Falls Rivet & Machine Company, Cuyahoga Falls, Ohio: Two Wadsworth core ovens, improved Wadsworth core making machines, both hand and power driven, a friction drive rumbling barrel, a gagger mold with demonstration as to its use.
- Edward J. Etting, Philadelphia, Pa.: The Etting No. 46 cupola, rumbling barrels, foundry ladles, Dings electro-magnetic separators.
- Killing Molding Machine Company, Davenport, Iowa: Molding machines, rollover, straight draft type; rollover drop machines, roll out molding machines, stripping plate molding machine, and air, water, or steam power driven sand sifters.
- Randall Tramrall Company, Philadelphia, Pa.: Moyer system of overhead tramrall transmission.
- Joseph Dixon Crucible Company, Jersey City, N. J.: Crucibles for melting metals of all descriptions, plumbago retorts and special shapes, also an educational exhibit of used crucibles.
- Oliver Machinery Company, Grand Rapids, Mich.: Pattern makers' lathe, with band saw and No. 3 trimmer.
- Standard Sand & Machinery Company, Cleveland, Ohio: Continuous sand mixing machine, conveying machine, mixers, screens, &c.
- Smyth, Swoboda & Co., New York City: Parting Compounds.
- Primos Chemical Company, Primos, Pa.: Display of ferro and other alloys.
- Cortland Corundum Wheel Company, Cortland, N. Y.: Corundum wheels, both standard and special shapes, grinders, &c.
- Robeson Process Company, Camden, N. J.: Gluetrin core binder.
- Western Foundry Supply Company, East St. Louis, Mo.: Ferro alloys, facing and refractories.
- Link-Belt Company, Philadelphia, Pa.: Conveying machinery, reciprocating sand elevator and conveyor; Renold silent chain drive.
- Chicago Pneumatic Tool Company, Chicago, Ill.: Pneumatic riveters, drills, chippers, grinders, rammers, sand shakers, and hoists, air compressors.
- Henry E. Pridmore, Chicago, Ill.: Four molding machines of the new style rockover and drop types, brake shoe molding machines, &c.
- E. H. Mumford Company, Philadelphia, Pa.: Molding machines, plain power rammers with match plates of both steel and aluminum, No. 2 Pridmore machine, No. 2 Pridmore machine with Mumford vibrator and frame, power ramming split pattern machine, sand shaker with Mumford loose ring adapted to supplying sand to molding machines.
- Camden Coke Company, Philadelphia, Pa.: Exhibit of coke manufactured by the Otto-Hoffman by-product system.
- Cyrus Borgner Company, Philadelphia, Pa.: Fire brick and fire brick shapes.
- W. W. Lindsay, Philadelphia, Pa.: Chaplets.
- U. S. Graphite Company, Saginaw, Mich.: Graphite products.
- Garden City Sand Company, Chicago, Ill.: Molding and core-making sands.
- Kerr Turbine Company, Wellsville, N. Y.: Turbine engine, direct connected with fan.
- Detroit Foundry Supply Company, Detroit, Mich.: Revolving sand sifters, Crandall cupolas and air cooled gagger board.
- Monarch Emery & Corundum Company, Camden, N. J.: Line of emery and corundum wheels, electrically driven grinder.
- Foundry Specialty Company, Cincinnati, Ohio: Line of partings and facings, particularly Partine; also a new metal cleaner, known as Fluxine.
- A. E. Hoermann, New York: Sand blast machine, air compressors and pneumatic machinery.
- Mitchell-Parks Mfg. Company, St. Louis, Mo., and A. Buch's Sons Company, Elizabethtown, Pa.: Gravity molding machine.
- Goldschmidt Thermit Company, New York City: Various appliances for heating and purifying metals, demonstration of welding and burning, pipe welding, apparatus for welding by the use of Thermit.

TENT ADJOINING THE ARMORY.

- Monarch Engineering & Mfg. Company, Baltimore, Md.: Monarch melting furnaces in operation, core ovens, Monarch burners for core ovens and molds.
- American Ferroflux Brazing Company, Philadelphia, Pa.: Brazing process in operation, using either illuminating gas or oil fuel.
- Hawley Down Draft Furnace Company, Chicago, Ill.: Swartz melting furnaces.
- Ph. Bonvillain & E. Rocera, Paris, France: One R-3 swinging universal molding machine, one R-4 swinging universal hydraulic molding machine, one A-3 molding machine, one sand distributor, one hydraulic accumulator, one pump, one template cutting machine, one A-6 molding machine.
- Hermann Pneumatic Machine Company, Zelonople, Pa.: Nos. 3, 12, 14 jar molding machines.
- Arthur Koppel Company, New York: Industrial railway, dump cars, portable tracks and switches.
- Main Belting Company, Philadelphia, Pa.: Leviathan belting.
- Holland Linseed Oil Company, Chicago, Ill.: Core oil, core binders, &c.
- Rockwell Engineering Company, New York City: Fuel oil burning appliances, double chamber Rockwell melting furnaces, ladle heaters.
- Cooper-Hewitt Electric Company, New York City: Cooper-Hewitt light installation.
- Otto Gas Engine Company, Philadelphia, Pa.: 60-hp. Otto gas engine driving 45-kw. Crocker-Wheeler generator, furnishing power for driving the working exhibits. 9½ and 3½ hp. Otto gas engines running free.

Pennsylvania Laws Affecting Corporations.—An act to validate contracts, bonds or obligations of corporations which had not first established places of business and agents in the State has been signed by the Governor of Pennsylvania. This relates to what are classed as foreign corporations and will remove disabilities resting upon considerable business. A bill has also been signed to give the Auditor-General more power to collect from corporations, limited partnerships and joint stock associations what is due the State by requiring a receiver, trustee, assignee or other officer to give the State notice of intention to sell property placed in his hands by legal proceedings, and no distribution of proceeds of such a sale is to be permitted until the Auditor-General has certified that the notice was given to him before the sale was made.

The Duty on Fish Hooks.—The Board of United States General Appraisers has sustained a claim filed by L. D. Lothrop, Gloucester, Mass., regarding the rate of duty to apply to fish hooks made from round iron or steel wire. Duty was assessed at the rate of 40 per cent. ad valorem and 1¼ cents per pound under the provisions of paragraph 137 of the tariff act. The claim made in the protest was that the wire from which the hooks are made is valued at not more than 4 cents per pound, and that the hooks are dutiable only at the specific rates named in the first part of the paragraph 137, plus the 1¼ cents per pound prescribed in the second proviso.

The old question of prison labor will probably arise in Pennsylvania when a test is made of an act recently passed by the Legislature to authorize sheriffs to employ prisoners to work on roads. This measure has been brought forward for years and there is already some objection to it. It is contended by some that it is needed because of the high price of labor and the great extension of road building.

Hanover, Germany, was the first city to purchase a complete automobile fire engine service, consisting of engines, hose carts and hook and ladder kit. The system is past the experimental state, as most of the apparatus has been in service now for a period of five years. It has proved itself entirely satisfactory, says Consul-General Jay White, and more economical than the horse drawn engines and carts.

A Bridgeport Heavy Automatic Knife Grinder.

A new motor driven 144-in. heavy cup wheel knife grinder with solid bracket bed, built by the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn., is shown in Fig. 1. The bed extension shown at the center of the rack supporting the emery wheel and motor is also of solid cabinet construction and is bolted rigidly to the main bed. The cup emery wheel is 24 in. in diameter, 8 in. deep, with 2-in. rim, and is driven at a speed of about 450 rev. per min. by a $7\frac{1}{2}$ -hp. motor. The latter is mounted above the emery wheel spindle on a substantial base and is connected with the spindle by a cut gear and pinion having cast iron guards.

The wheel as normally positioned, with its grinding

can be shifted by the large hand wheel, and again turning the hand nut causes automatic feed to be resumed, therefore to stop the carriage it is not necessary to stop either of the motors.

The knife grinders are made in sizes up to and including 180 in. The important dimensions of the size illustrated, the 144-in., are as follows:

Diameter of emery wheel spindle, inches.....	3
Length of front bearing, inches.....	10
Length of rear bearing, inches.....	8
Height from floor to top of table, inches.....	24
Height from floor to top of bed, inches.....	22
Height from floor to top of knife bar, inches.....	33
Knife bar, inches.....	$6\frac{1}{2} \times 6$
Floor space occupied, inches.....	$233\frac{1}{4} \times 50$
Floor space occupied in grinding, inches.....	272×50
Weight, pounds.....	9,000

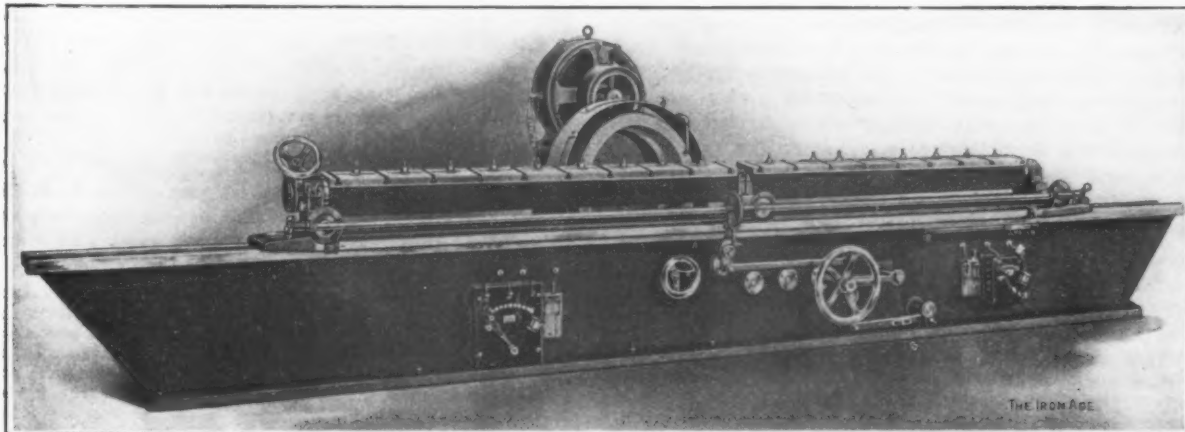


Fig. 1.—A Heavy Motor Driven Automatic Knife Grinder Built by the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn.

edge parallel to the bed, will grind a perfectly flat surface, but should it be desired to grind a slight concave, the emery wheel may be turned through a small horizontal angle. For such a condition the driving of the wheel by a motor is an advantage, for the motor is fastened on the same table on which the emery wheel swivels, as may be seen in Fig. 2, and the two are always in perfect alignment. The knife bar is a large hollow square column, very stiff, so that long knives can be drawn down to it firmly, taking out the wind and spring caused by tempering. In addition to the end supports of the bar there is a center support, which adds greatly to the rigidity of the bar, making it practically impossible to spring it. On the end of the knife bar is a graduated dial, so that the knife can be quickly set and ground to the same degree or bevel as previously ground. There are adjustable dogs on the carriage which can be set to grind any length within the capacity of the machine. The knife bar is revolved through a worm and worm gear by a large hand wheel.

The carriage is very strongly back geared and is driven by a 5-hp. motor, the pinion on which, through a double friction gear, is connected to the driving gear. The friction gear slides on its shaft to engage with one or the other of two bevel gears running in opposite directions and connecting with the train of back gears driving the carriage. By this arrangement the motor runs continuously in the same direction, as it does not have to be reversed to reverse the carriage motion.

The knife bar is fed forward to the wheel automatically by bevel gears and cross feed screws at each end and the center, so that the feeding is uniform. The cross feed is regulated by a thumb screw and can be adjusted so fine that it will grind to 1-7000 in., or as much more as may be desired. It will stop feeding and grinding at any point, hence, when properly adjusted and set in motion, no attendant is required.

As the wheel becomes worn, the knife bar can be run forward readily by the feed rod handles or the wheel can be advanced on the dovetailed gibbed ways on the back extension by the small hand wheel shown in the middle of the bed in Fig. 1. In the center of the large hand wheel shown on the front of the bed is a hand nut which controls the friction gear. Loosening this nut will immediately stop the carriage motion, when the carriage

The wheel being of such a large diameter, its cutting surface is greater and the wear slower than for a smaller wheel, thus avoiding putting in new wheels so often. As the speed of the wheel is constant and the wear of the

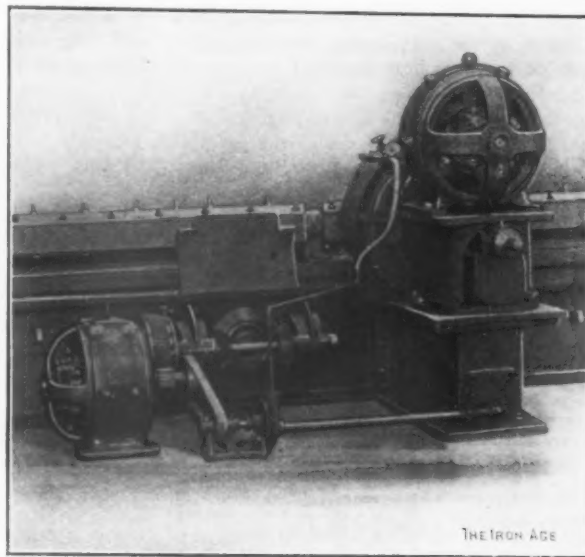


Fig. 2.—A Rear View of the New Bridgeport Knife Grinder, Showing the Two Driving Motors.

cutting edge does not decrease the diameter, the same peripheral speed is maintained until the wheel is entirely worn out.

The ninety-third meeting of the American Institute of Mining Engineers will begin at Toronto, on July 23, 1907, with a session to be followed with sessions on the morning and afternoon of the 24th. A special train will then carry the party to Cobalt, where several days will be spent in visits to the mines. On Monday and Tuesday, the 29th and 30th, a visit will be made to the famous Sudbury nickel copper district.

The National Association of Manufacturers.

The proceedings of the first two days of the twelfth annual convention of the National Association of Manufacturers, held at the Waldorf-Astoria, New York, May 20 and 21, were printed in *The Iron Age* of last week. Following is a report of the proceedings of May 22, the last day:

A telegram was read from W. E. Skinner, president of the Colorado Commercial Association, inviting the convention to meet in Colorado next year.

Chairman F. C. Nunemacher of the Committee on Resolutions reported three resolutions, all of which were adopted. The first favored appropriations for internal waterways, the second recommended measures for preserving the forests, and the third, which the convention by vote ordered telegraphed to Patrick Calhoun, president of the United Railways, at San Francisco, pledged the confidence and support of the association in "the struggle for fair American conditions in which the business interests of San Francisco are now engaged."

Postal Reforms Needed.

Capt. Henry A. Castle, former auditor of the Post Office Department, was introduced and delivered an address on "Needed Postal Changes." He spoke of the enormous business conducted by the United States Post Office Department and proceeded to criticize its administration as follows:

This purely business enterprise is organized and with only a single exception is administered in absolute disregard of all correct business principles. The organization is antiquated and illogical. No official in high authority has a permanent tenure. The head of the Department is a political appointee, subject to constant "rotation." In the past 15 years we have had nine Postmasters-General.

He set forth the pressing need of a reorganization of the department, the introduction of modern business methods and provision for a general manager of the department to stand next to the Postmaster-General, as his adviser, with a permanent tenure of office.

He praised the force engaged in the collection and delivery of letters and papers, stating that this is the only branch of the service not needing reform, and then proceeded to show how many of the details of management should be changed to conform to modern business methods, such as the accounting system, the money order service, the contract policy, the franking privilege, the pay for transportation, &c. Regarding rural free delivery, he said:

The rural free delivery service needs reform. This new and valuable agency of civilization is highly popular but enormously expensive. It will cost \$38,000,000 this year—or about \$1000 for each route served. As the postage receipts for all the mail handled on an average route is less than \$200 a year, we can see a pecuniary loss of at least \$800 in each case. We cannot abandon the service, but we can make it more remunerative. The Department recommends a local package express, whereby the carrier can, in addition to his legitimate mail, carry packages for his patrons from the village where he begins his delivery at a very low price, but sufficient to produce in many cases the full amount of the present deficit. The experiment is well worth trying and cannot be too speedily inaugurated.

Business men and large patrons of the letter mail are getting insistent for 1-cent postage. They are evidently paying more than their share of the cost and are entitled to relief. After the leaks and wastes are corrected it can come without crippling the service, provided no more unprofitable features are added. One-cent letter postage may, with propriety, be kept in view as the ultimate end of postal reform.

He attacked a tendency of the times in the following spirited language:

We must resist the inclination to cure all Government ills by an appeal to paternalism or State socialism. Express charges are high, therefore we are told that we should have the parcels post; savings banks fail occasionally, hence postal savings should be established; life insurance companies have been under a cloud, and post offices should be turned into indemnity shops; telegraph tolls are sometimes excessive, and the Government should annex the telegraphs to the mail system. Some of these cries are very popular. The agitator who proclaims most loudly against government by injunction is most vehement in urging innovations that would soon leave the Government in the hands of a receiver. It may be true that the postal service could handle our telegrams at reduced rates, but little, compact England loses \$3,500,000 per annum trying to do it. It may be that we could pay 3 per cent. interest on postal savings

deposits, fund them in 2 per cent. bonds at a premium and earn profits after paying an army of employees, but it is hard to figure out such a result.

Railroad Regulation.

Charles A. Prouty, member of the Interstate Commerce Commission, addressed the convention on "Further Railroad Legislation." Personally, he said, he would like the agitation against railroads to cease, but he did not believe it could be stopped. He advocated the establishment of a railroad department, which should be charged with that part of railroad regulation which is properly administrative and executive. The commission should be an impartial body, entirely withdrawn from all extraneous influences, whose sole duty it should be to hear and decide the questions presented to it. He did not ask that additional powers should be conferred upon it. Speaking of the grievances of shippers, he said: "The railroad company should not be deprived of its property by a reduction in its rate until it has been given a fair hearing before some disinterested tribunal, but the duty of beginning that complaint, the duty of prosecuting that complaint, rests upon the Government and should not be cast upon private individuals."

Advancing the proposition that if a regulating body is authorized by law to administer railroad affairs it should exercise the same control over the physical operations of railroads which it exercises over their rates and their practices affecting rates, he continued:

Adequate facilities for the movement of traffic are of even greater importance to the public than reasonable rates for such movement. This is particularly true with you as manufacturers. The freight rate enters into and increases the cost of production, and it sometimes limits the area of distribution. It is therefore of importance to the manufacturer, but still, if his rate is properly adjusted with respect to the rates of his competitors, any cost above a reasonable compensation enters into the price of the article which he manufactures and is finally borne by the consumer. Upon the other hand, the facility is vital. Unless he can obtain at some price the service of transportation his business is at a standstill. The business interests of this country must have adequate railroad service.

He regarded the principle of reciprocal demurrage as a fair one. Relative to the valuation of railroad property by the national Government, he said:

The popular impression that if the value of our railroads were known it would be easy to so adjust rates that a fair return upon that value, and only a fair return, would be obtained, is entirely erroneous. The most that could be done in most cases in fixing the value of our railroads would be to determine the cost of their reproduction at the present time, although in some instances it might be possible to determine the original cost of construction and subsequent expenditures. It is not possible to fix rates so that a given per cent. will be returned to the stockholders of a railroad.

The railroads of this country embrace a very considerable portion of its entire wealth, being, next to agriculture, by far the most important industry. Railroad securities ought to be a favorite investment for the savings of the small and great alike.

It is the common impression that all railroad regulation is conceived in a spirit of hostility toward the railroads. I say to-day, as I have been saying for the last 10 years, that fair regulation is not inimical to the fair operator. What better evidence could be found of this than the present state of public opinion? To-day the general impression is that every railroad man is either an incompetent or a rascal. And why? Not because such is the fact, for the great majority of railroad operators are both able and honest, but because the operations of a few arch sinners have left their trail upon the whole congregation. When such operations are no longer possible the honest operator is secure.

The Association Favors Tariff Revision.

The Committee on Tariff Reciprocity, of which H. E. Miles of the Racine-Sattley Company, Racine, Wis., was chairman, reported that a vote on the subject of tariff revision had been taken by correspondence with the members, with the following result: "Of those members who have replied to our inquiries upon this subject, out of a total of 1800 members, 350, or 20 per cent., are radically opposed to revision; 8 per cent. are opposed to it at this time on grounds of expediency, lest it unsettle business, &c.; 55 per cent. favor revision—most of them a radical kind, but one-fifth of them wanting only partial revision; 17 per cent. are indifferent or uninformed, or not entitled to vote. Those decidedly wanting revision now, or in the near future, therefore, number twice those who are either decidedly opposed to revision or opposed to it for the time being. Taken by industries, out of

77 different industries tabulated, 56 vote for revision, casting a total of 1510 votes; 16 industries vote against revision, casting a total of 102 votes; 5 industries are each tied in their votes, casting a total of 28 votes. One of the most interesting developments of our inquiry is the clear disclosure that our members are overwhelmingly in favor of a tariff commission, with semijudicial powers, as, for example, to summon witnesses, this commission to investigate thoroughly and scientifically the various schedules, and from time to time submit its conclusions in the form of recommendations to Congress and the Executive."

As a result of the committee's report the following was passed:

Resolved, That the National Association of Manufacturers declares itself in favor of a revision of the tariff at the earliest practicable date, and the making of treaties of reciprocity meantime as originally provided for by the present tariff laws; and,

Whereas, The members of the National Association of Manufacturers have, by correspondence, expressed themselves in the proportion of eight to one that to secure a thoroughly intelligent revision of the tariff there should be established a nonpartisan tariff commission, not unlike the present Interstate Commerce Commission, with semijudicial powers, as, for example, to summon witnesses, this commission to investigate thoroughly and scientifically the various schedules and from time to time submit their conclusions in the form of recommendations to Congress and the executive; therefore, be it

Resolved, That the National Association of Manufacturers formally declares itself in favor of such a commission, and hereby instructs its officers to make every reasonable endeavor to secure the appointment of such a permanent commission at the earliest possible date.

Other Committee Reports.

The Committee on Resolutions reported in favor of a law carrying out the consular reforms recently advocated by the President; in favor of a permanent bankruptcy law, and the following resolution relating to efforts to raise \$500,000 per annum for three years for purposes of education and organization:

Resolved, That the National Association of Manufacturers, in convention assembled, reasserts the New Orleans platform and instructs its officers to take the necessary steps to establish and finance a council to serve as a means of harmonizing and federating the various national and State organizations of citizens, merchants and employers, to the end of uniting them in a vigorous educational campaign in the interest of industrial peace and mutual good will.

The Committee on Postal Affairs, through its chairman, James Maynard, submitted a report giving a copy of a memorial sent by the committee to the Postal Commission that second-class matter should not be handled at less than cost. In addition the committee submitted the following recommendations:

1. We believe that postage on all first-class domestic matter should be fixed at 1 cent per ounce. 2. We recommend the consolidation of third and fourth class mail matter. 3. We recommend to the members of the association, so far as they can individually and collectively, to use their influence to bring about the appointment of a business man as Postmaster-General, or a permanent official in the Department who would remain through party changes and be always at hand to advise the new Cabinet officer and maintain the continuity of the Department policies and plans.

Against the German Tariff Agreement.

By formal resolution, introduced by James MacColl, president of the National Association of Cotton Manufacturers, President Roosevelt was requested to withhold his approval of the new German agreement until testimony can be obtained relative to the probable effect on domestic producers of the export basis for dutiable values. In addition to being head of the cotton manufacturers' association, Mr. MacColl, the mover of the resolution, is president of the Lorraine Mfg. Company, Pawtucket, R. I. The preamble and resolution in full are as follows:

Whereas, The effective enforcement of a system of ad valorem duties must depend largely upon the ascertainment of fair market values of competitive goods imported from foreign countries; and,

Whereas, American industrial producers have in many cases found it difficult to compete successfully with foreign products when under the most rigid and effective enforcement of the law relating to "current wholesale market value in the country of production"; and,

Whereas, The change in our customs administrative methods of procedure involved in the agreement with Germany seems likely to operate so that certain favored foreign producers shall

be permitted to name lower "export values" for the purpose of reaching the American market on terms more satisfactory to themselves, thereby being enabled to reduce the amount of duties paid upon such exports to the extent that values for export are reduced below current wholesale market values, and thus introducing an element of competition not contemplated by the framers of the present tariff law; therefore be it

Resolved, That this association respectfully urges upon the President of the United States the withholding of his approval of the new German agreement until the testimony of practical producers can be obtained regarding the effects upon domestic labor and industry likely to follow the customs administrative changes in favor of special "export values."

Election of Officers.

The following officers were elected for the ensuing year:

President, James W. Van Cleave, of the Buck's Stove & Range Company, St. Louis.

Treasurer, F. H. Stillman, of the Watson-Stillman Company, New York.

Vice-Presidents—John Kirby, Jr., Dayton Mfg. Company, Dayton, Ohio; C. C. Hanch, Nordyke & Marmou Company, Indianapolis, Ind.; Jackson Johnson, of Roberts, Johnson & Rand Shoe Company, St. Louis; William McCarroll, American Leather Company, New York; David M. Parry, Parry Mfg. Company, Indianapolis; Daniel C. Ripley, United States Glass Company, Pittsburgh; William E. Tallmadge, Excelsior Wrapper Company, Sheboygan, Wis.; C. W. Post, Postum Cereal Company, Battle Creek, Mich.; F. C. Nunemacher, the Nunemacher Press, Louisville, Ky.; George G. Coppins, Walworth Mfg. Company, Boston; B. T. Skinner, Advance Thresher Company, Battle Creek, Mich.; Charles M. Jarvis, P. & F. Corbin, New Britain, Conn.; H. S. Chamberlain, Citico Furnace Company, Chattanooga, Tenn.; James Inglis, American Blower Company, Detroit, Mich.; D. A. Tompkins, D. A. Tompkins Company, Charlotte, N. C.

New names were added to the Board of Directors, including A. A. Schenck of Syracuse, to succeed Ludwig Nissen of New York; W. A. Vanster, to succeed Elliott Durand of Chicago; L. E. Paullin, to succeed R. C. Jenkinson of Newark; Henry E. Miles of Racine, Wis., to succeed W. E. Tallmadge of Sheboygan, Wis.

Marshall Cushing, the secretary, was re-elected at a meeting of the new Board of Directors.

Some Labor Matters.

A notable resolution passed was one referring to illegal combinations, "whether of capital or labor," demanding that all laws be equally enforced against all combinations whose operations are in violation thereof and which abridge the rights of citizens, concluding as follows:

Resolved, That in accordance with the above declaration of principles, we urge upon federal and State authorities to investigate vigorously and thoroughly all labor organizations, and where their acts are found to be illegal and in restraint of trade or commerce, or otherwise in violation of law, to punish the parties responsible for every such violation according to the punishment prescribed therefor.

John Kirby, Jr., of Dayton, Ohio, read the report of the Committee on Prison Labor. The committee was unanimous in the opinion that the subject of convict labor, the extent to which it should be enforced, the class of goods in the manufacture of which it should be employed, and the general management of the penal institutions of the country, is one concerning which there is such a diversity of opinion and such varied interests that it was unable to agree upon any recommendation other than that the goods which are manufactured by convict labor should be as diversified in character as is practicable.

The Banquet.

The annual banquet of the association was held on Wednesday evening, following the final adjournment of the convention in the afternoon. Some 500 plates were laid for the occasion in the grand ballroom of the Waldorf-Astoria. Wm. McCarroll was toastmaster. President James W. Van Cleave was the first to respond to a toast. He asserted that it was not the purpose of the association to fight any union, but to fight simply for the right to manufacture under conditions of industrial peace.

Secretary Oscar S. Straus of the Department of Commerce and Labor spoke on "Commerce, Combinations and Labor," dwelling upon the marvelous development of the business interests of this country and the relations of his department to corporations. On this subject he said:

A corporation desiring to perpetuate its domination may use its combination power to give better service—that is, a public good—but when that power is used to prevent any one else from giving a like service or the best service it can, then its combination power is being used as an encroachment upon the rights of others and against the public welfare. It is not within the power or proper sphere of government to equalize competitors, but it is within the power and proper sphere of government to equalize the opportunities of competitors. It is the sphere of government to keep open equally to all men the avenues of commercial development, to maintain the opportunity for competition, and to prevent the use of unfair means that diminish or destroy such equal opportunity.

Rear Admiral Charles D. Sigsbee spoke for the navy and Gen. Franklin J. Bell for the army. Senator Dol-

The Improved No. 2 1-2 Bath Universal Grinder.

Improvements have been made in the universal grinder built by the Bath Grinder Company, Fitchburg, Mass., which have greatly increased the efficiency of the machine for all classes of work for which it is intended. Fig. 1 shows the machine and attachments as furnished for many classes of grinding. The attachments are in general the same that have been furnished with the grinder for the last two or more years,* including as work holding fixtures chucks, vises, V-vise for round work and universal holder, by which work clamped in one of the vises or chucks may be positioned at any horizontal or vertical angle. Wherever desirable the fixtures are graduated to facilitate setting. Another attachment is one for internal grinding, which carries its own spindle and is driven by belt from a pulley mounted on the main

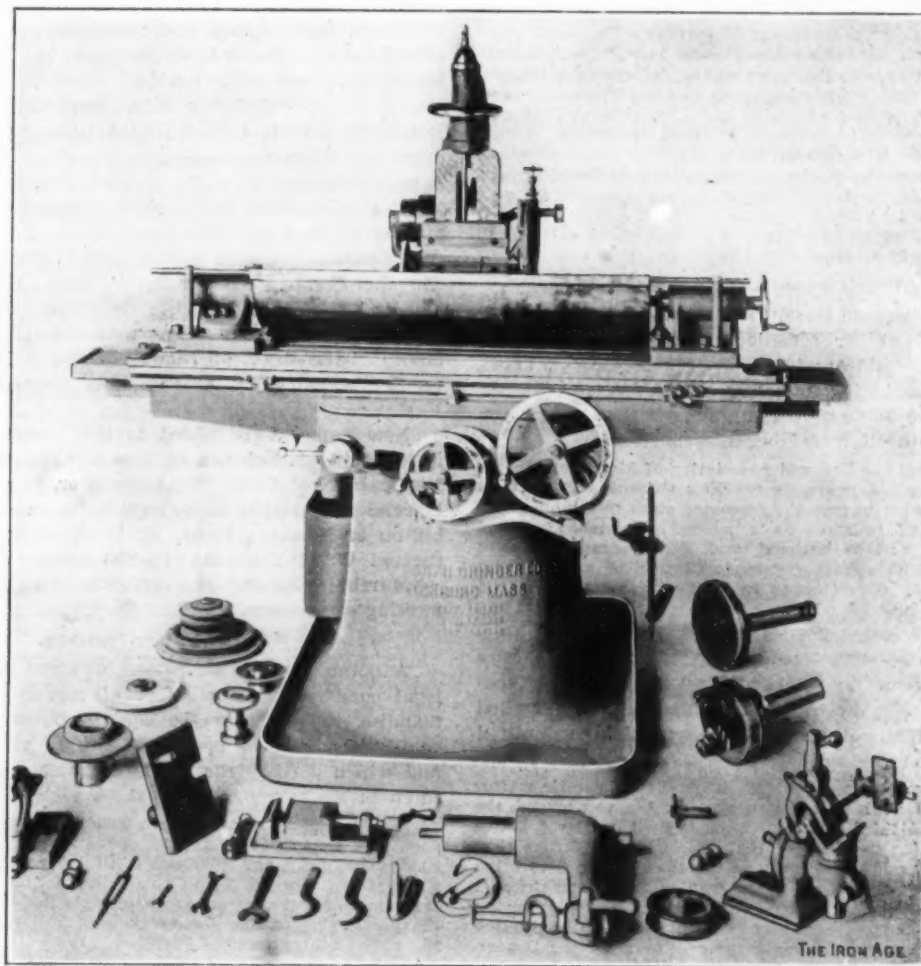


Fig. 1.—The Improved No. 2½ Universal Surface Grinder Built by the Bath Grinder Company, Fitchburg, Mass.

liver of Iowa, who had been scheduled to speak, was prevented by illness from being present. Rev. Dr. John Dunn Burrell of Brooklyn spoke on "The Era of Work." A rising toast was given to the efficient secretary of the association, Marshall Cushing.

The Governor of Pennsylvania has approved the Wilbert bill to limit car service charges to \$1 per day per car. This act is a general one and covers all railroads in the State as well as associations and corporations. It fixes the maximum at \$1 for each car for each day of 24 hr. or fraction of a day, including storage charges on each car not unloaded or within the free time for unloading. Free time for loading or unloading all freight is to be computed from seven o'clock in the morning of the day following the placing of the car and mailing notice for 48 hr. When a car is placed after 12 o'clock meridian of any day the free time is to be computed from noon of the day following such placing.

grinding spindle in place of one of the grinding wheels. This is adjustably supported and belt tension is regulated by raising or lowering the main spindle head. Fig. 2 shows the work table swung to a position at right angles to that occupied in Fig. 1 and with a hooded wheel for wet grinding in action. This position is preferable for many classes of surface grinding.

One marked improvement is in the spindle head, which is much heavier than the old pattern, and is bored tapering to receive taper split boxes. The large ends of the taper boxes are at the end of the head, giving rigidity to the spindle at both ends upon which wheels are mounted. Surrounding the spindle box on the right hand end of the spindle head is a projecting square flange, to which the wheel hood is clamped. This flange is independent of the box bearing. The clamp screw for binding the hood to the head is directly under the spindle, and the hood makes a rigid guard in case the wheel breaks.

* A more complete description with illustrations of these attachments appeared in *The Iron Age*, March 2, 1905.

Fig. 2 shows the extension arbor support for the wheel when doing surface grinding. On the top of the front face is a $\frac{3}{4}$ -in. slot for locating the support. The arm has a tongue on the back face that fits into the groove and is clamped to the arm by two cap screws. On the projecting end of the arm there is a phosphor bronze bearing, the lower end of which is adjustable to the spindle. This assures absolute rigidity and allows no spring in the spindle when doing surface work. Mounted on the end of the arm is a wheel hood arranged for holding the water spout. In this case the water spout is used on either wheel hood, as shown.

The spindle head is elevated by a vertical hand wheel on the top of the machine, a graduated dial indicating the amount of the vertical movement to 0.001 in. The spindle is driven by a horizontal belt, and any tension of belt desired is obtained by the adjustment of nuts, on thrust rods, one on each side of the cone frame.

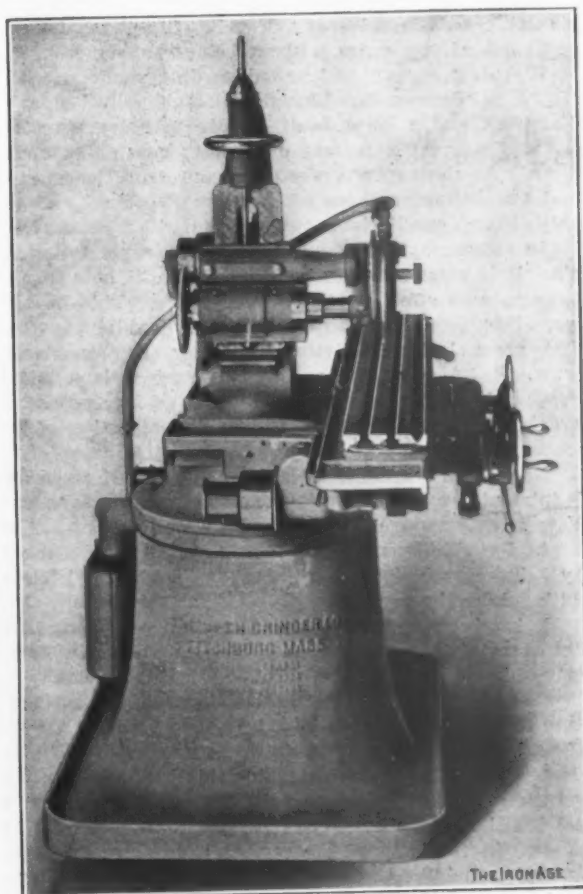


Fig. 2.—The Bath Universal Grinder as Commonly Set for Surface Grinding.

Another improvement is the lengthening of the bearings of the table slide, which adds greatly to the rigidity of the machine. On the left side of the apron, opposite the two hand wheels, is shown one of the combined levers for reversing the machine in either direction and for stopping it. By this construction, in all kinds of grinding, only one hand of the operator is required to reverse or stop the machine, leaving the other hand free, a very desirable feature on a grinding machine.

The distance from the center of the spindle to the top of the swivel plate is $11\frac{1}{2}$ in. Between centers the machine takes work up to 36 in. long, and it swings either $9\frac{1}{2}$ or 14 in. It will grind a surface 8 x 36 in. The weight of the machine, complete with all attachments, is 3500 lb.

The Niles Iron & Sheet Company, Niles, Ohio, has changed its name to Niles Iron & Steel Company for the purpose of avoiding complications which have been occurring in its mail. Correspondents of the company are earnestly requested to observe the change.

A Japanese Tariff Problem Looms Up.

Japan is stated by a correspondent of the *New York Herald* to be at the beginning of a tariff contest that may have deep significance to the rest of the world. The financial authorities of the government are now engaged in an investigation bearing upon the tariff revision that is bound to come within the next few years, and already there are evidences that the popular demand, as well as the official inclination, will be for a tariff that will furnish a much higher measure of protection to home industry than is now furnished by the rates provided for in the conventional treaties with the United States and the nations of Europe.

Recognizing the importance of the coming changes, the commercial nations of Europe have already taken steps looking to the protection of the interests of their commerce. It is imperative that the United States should take similar steps and without delay. This country is by far the best customer of Japan. In the five years from 1901 to 1905, inclusive, the United States admitted duty free from Japan goods to the value of \$151,942,000, while Japan admitted duty free from the United States goods to the value of but \$43,273,000.

Self-interest would seem to dictate that in any tariff revision it would be the part of wisdom for Japan to give especial consideration to the commerce of the United States, for she could ill afford a tariff war which would necessarily operate to the disadvantage of Japanese commerce far more than it would affect American commerce. It is apparent from these figures that even under the existing conventional tariff to which she objects Japan is getting very much the better of the bargain. Then, too, the exports of the United States to Japan represent only about one-thirtieth of our total exports, while Japan's exports to the United States are nearly one-third her total exports.

Notwithstanding, however, that we are by far her best customer, it will not do for the United States Government, nor for the great commercial interests directly affected, to let Japan go ahead with her tariff making without seeing that American interests are intelligently cared for.

The Detroit Tunnel Electrical Equipment.—The General Electric Company, Schenectady, N. Y., has secured the contract for furnishing the electrical equipment for the tunnel which is being built by the Michigan Central Railroad under the Detroit River for the traverse of freight and passenger trains between the United States and Canada. Two tracks will be laid in separate iron tubes 65 ft. below the surface of the river. These tubes will rest on beds of concrete and will be flanked by concrete walls. The electrified zone, 4.6 miles in length, will comprise, with the yards, some 15 miles of single track. Electric locomotives will be used for hauling both freight and passenger trains, and of these six 100-ton direct current machines have been ordered. Each locomotive will be capable of hauling a 900-ton train up a 2 per cent. grade at a speed of 10 miles per hour. Four 280-hp. motors will be mounted on each locomotive, two motors being placed on each of the two swivel trucks. The Sprague-General Electric multiple unit control system will be furnished, enabling the locomotives to be operated singly or in train. Current for operating the motors will be taken from the third rail by means of contact shoes. Current will be supplied by a local electric company.

Charles M. Schwab, while at Pittsburgh last week, spoke as follows to a local reporter: "As the West develops the needs of various communities will be supplied in part by the Western works, but the great bulk of the output as well as the high-grade work, must come from the East. Here are the works and the workmen that have been developed as the result of two generations of application to the business. Leaving aside other considerations of the nearness of supplies and so on, no section can ever hope to overcome the advantage Pittsburgh has."

The Art of Galvanizing.—II*.

BY ALFRED SANG, PITTSBURGH.

The Nature of Zinc Dust.

The vapor of zinc, which is given off at a temperature of 1000 degrees C. or more, at the inception of distillation, comes into contact with the comparatively cold atmosphere of the flue, and the sudden chill causes a rapid condensation of the vapor, so rapid indeed that it skips the liquid stage and drops in the shape of perfectly spherical particles, of which about 30,000 million can be crowded into a cube measuring one-sixteenth of an inch in every direction. This impalpable powder which, notwithstanding its high specific gravity—for it is only about 10 per cent. lighter than zinc—can be blown about like lycopodium, is used mostly by paint manufacturers, and is sold packed in barrels holding about 1500 lb. It is 10 or 15 per cent. cheaper than virgin spelter at equal content of free zinc. It cannot be melted into slabs on account of its rapid oxidation at a very low temperature.

The peculiar properties of zinc dust have been ascribed by some to the presence of cadmium, which being a more volatile metal is distilled first from the ore and condensed in the flues. One observer found quantities ranging from 0.283 to 0.794 per cent. in flue dust after two hours of furnace operation. Others have claimed that these properties are due to the presence of zinc oxide or other impurities. No plausible reason for these theories has as yet been advanced.

Most of the zinc dust is produced in Belgium or in Silesia, and a sample which I have had analyzed showed the following composition:

Per cent.		Per cent.	
Metallic zinc.....	88.95	Cadmium	0.62
Zinc oxide.....	6.88	Sulphur	0.055
Lead	3.45	Iron	0.04

G. Williams, an English chemist, has shown† that zinc dust takes up water and decomposes it, and gives up its hydrogen on heating. He has also shown that it absorbs hydrogen at ordinary temperatures when surrounded by it in a moist condition, and that heated alone it yields 50 times its volume of hydrogen, but when heated to redness with an equal weight of zinc hydroxide it gives off 535 times its volume of hydrogen. All this may have some bearing on the antics of zinc dust and on Sherardizing, but, as I am about to show, it is unlikely and lacks confirmation, both theoretical and practical.

Impurities Are a Negligible Factor.

It is my belief that these impurities have little or nothing to do with the properties of zinc dust, and that the reasons should be sought for in its mode of production.

If under similar conditions of rapid cooling we produce other solid bodies we get unstable and brittle results. If a bead of fused glass is dropped into water a "Rupert's tear" is the result. As you know, a Rupert's tear is very unstable, and, whereas for a drop of normal glass of similar dimensions several good strokes of the hammer would be required to pulverize it, the Rupert's drop can be shattered to fragments by breaking off its tail with two fingers or by scratching the surface film, whose tension keeps the drop together. The difference of energy required to effect the destruction of the normal drop and the Rupert's drop is enormous.

If we assume that zinc dust is in this critical state we can explain almost every one of the effects which have puzzled chemists during the past 40 years. Douglas Carnegie‡ found that zinc dust *instantly* reduced ferric to ferrous salt, and *this even in neutral solutions*. (The italics are his.) This action, he states, was considerably quicker than with granulated zinc in the presence of sulphuric acid. He was at first inclined to ascribe this wonderful efficiency to the occluded hydrogen mentioned by Williams, but further experiments, which I need not detail, showed that he was mistaken. Referring to another chemical operation in which zinc dust acted with equal promptness, he writes: "Zinc dust merely effects

instantaneously the dechlorination which I found zinc foil required several hours to effect."

Its Affinity for Oxygen.

It is so well known that zinc dust has a great affinity for oxygen at a low temperature that it has been used for a long time in the discharge style of printing of cotton goods. The fabric is first dyed a plain color and it is then printed on with a discharge paste. The zinc dust acts as a reducing agent at the temperature of the boiling water in which the cloth is dipped to effect the discharge.

A fact that is undoubtedly responsible in a great measure for the mystery attaching to the action of zinc dust is its readiness to oxidize. It is only when oxidation is put out of its power, as in the closed Sherardizing drum, that heat will produce sufficient overstrain to cause the particles to burst into vapor. This vapor so suddenly released will condense instantly on the coolest spaces it can find. In dry galvanizing the coolest spaces are on the articles in the drum, and the drum itself being always hotter does not receive any deposit. One drum has already lasted two years without being coated.

Zinc dust appears to break down into vapor at about 150 to 200 degrees C., although it undoubtedly begins to disintegrate at a lower heat. As the pressure increases it takes a greater amount of heat to cause the breakdown. As the vapor condenses the pressure is relieved and the hotter particles of dust are vaporized and re-establish an equilibrium.

In reference to this question of the vaporization of zinc, it is a well-known fact that zinc will at ordinary temperatures affect a photographic plate. This has always been ascribed to zinc vapor, which exhibits in that state great chemical activity. Radiology, the new science, is expected to bear the burden of all such actions, and I suppose I ought to say that the action of zinc on photographic plates is due to the slow disintegration of its atoms into energy and helium.

In a small way it is a significant fact that zinc dust is intensely exothermic in its reactions, which means that these reactions are accompanied by the production of heat. I could also mention the property first pointed out by Schwarz, which zinc dust has of combining violently with sulphur by percussion.

It has been known for some time that a cement made out of certain oils and zinc dust possesses the useful property of becoming exceedingly firm and adhering closely to iron, steel and other metals, when heated to a temperature of 150 degrees C., or even less, if treated for a sufficient length of time. The theory of the nature of zinc dust which I have given explains this hardening by the release of the zinc from its peculiar condition to form a solid without the formality of passing through the liquid stage. In the body of the cement it is protected from oxidation and the zinc becomes mechanically continuous. It is an excellent composition for calking cracks and crevices in metallic objects, for packing joints and for smoothing off the surface of castings.*

I think that I have given a sufficient number of examples to show that zinc dust is a substance in a very abnormal physical condition, and if I have spent so much time in doing so it is because I feel certain that by taking advantage of this abnormal condition the metallurgical industries will before long reap important benefits.

Zinc Vapor and Ferrozinc.

I must tell you more about zinc vapor. This vapor is a gas just like air or any other gas and subject to the same physical laws, but as it is produced by the breakdown of zinc dust particles at a very moderate temperature it finds itself in the gaseous state at a point below its critical temperature, and it will therefore readily assume the solid state by condensation under its own pressure, confined as it is within a retort.

When iron is pickled, hydrogen is given off on the surface and rises to the top of the vat. The pickle works its way into the metal and hydrogen is given off below the surface and remains occluded. This occlusion has very surprising results: the surface of the iron is hardened, and if it is to be drawn through a die or worked in any way, it is necessary to bake out the gas. Hydrogen has

* Read before the American Foundrymen's Association, Philadelphia, May, 1907. Part I was printed on pages 1552 to 1555 in *The Iron Age* of May 23.

† *Chemical News*, Vol. 52.

‡ *Transactions Chemical Society*, London, year 1888, p. 468.

* This composition is patented.

been long suspected of metallic proclivities; it is often classed as a metal. It is known to form an alloy with palladium, and it is supposed to alloy itself to the iron to produce the hard skin of which I have spoken. Zinc vapor acts in the same way in dry galvanizing, but it forms an alloy all the more readily because in its normal condition it is itself a metal as we generally understand that rather arbitrary term.

Zinc Vapor Forces Itself Into the Pores of Metal.

Being a gas, the zinc vapor can force itself into the pores of the metal and form a deposit to a depth which will increase with the duration of the treatment. A small piece can be alloyed throughout. An alloy of zinc and iron produced by fusion would be a sorry article when it came to be tested. "Zincoisen," as it is called, is zinc ruined by the addition of a quantity of iron, which renders it brittle and worthless. By alloying with vapor at a low temperature the qualities of the metal cannot be injured, but they may be greatly improved by the zinc forming an intermolecular binding, which fills spaces which would otherwise allow motions of the particles under stress which might injure their cohesion. The vapor deposit should increase toughness, and it is quite possible that this theory may have some bearing upon the general subject of the nature of alloys.

By using carbon as a condenser for free zinc vapor, out of contact with the dust, I have obtained a perfect zinc dew. I used a common arc lamp carbon, and the drops on the top were large and reduced in size down to microscopical proportions on the edges. Here and there on the inside were traces of zinc, showing that the gas had penetrated the mass. The zinc vapor had not alloyed to the carbon, the specific heats being wide apart, whereas I have observed that the closer are the specific heats of the zinc and the material to be coated at their working temperatures, the more quickly and firmly would they combine. It is no doubt on this account that copper becomes coated so much more rapidly than does iron.

Improvements in dry galvanizing will undoubtedly be founded on the intelligent control of the temperature, but to this end temperature readings will have to be taken inside the retort and not in the furnace, as heretofore.

Results Obtained by Working with Gas Alone.

Working with gas alone, and under the special conditions necessitated by the peculiar circumstances of the experiments, I was able to obtain quite a variety of deposits.* Rapid cooling will cause the zinc to condense as crystals, the adherence of which to the iron is, however, inversely proportional to their size. Normal cooling would seem to yield in all cases a fine glossy surface of what can be appropriately termed ferrozinc.

Examining this ferrozinc under about 400 diameters of enlargement, it exhibits the structure of the original metal. A piece of mild steel which had been thoroughly pickled and which had been treated by vapor only, and was, therefore, free from any exterior zinc coating, such as would have concealed the alloy if operated on in contact with the dust, exhibited the usual structure of an etched mild steel. This ferrozinc appears to be harder than the original iron and its rustproof qualities are the true secret of the exceptional efficiency of Sherardizing.

The Only Way to Test Dry Galvanizing.

The Preece test with sulphate of copper is not a fair test for dry galvanizing. It is almost without significance for the following reasons: The outer coating of the slightly oxidized zinc particles resists the test better than does the brighter hot coating or the porous electrolytic one, but the alloy, obtained by vapor treatment alone, and which is present in all dry galvanizing, readily takes the copper just as the iron itself would, and yet it will resist corrosion perfectly. The copper will deposit without destroying the zinc and the test is, therefore, worthless. The only way to test dry galvanized work is to put it into service.

The alloy known as nickel steel does not rust easily, and yet in a nickel plated article if the nickeling is partly removed the iron will be corroded. This shows that we must not expect contact theories to adapt themselves to

perfection to metals in solution, to alloys. The alloy of nickel and iron resists corrosion, and in my opinion it is a parallel case to that of ferrozinc.

The Romans, to make their brass, which they called "orichalcum," threw cadmia (oxide of zinc) on highly heated copper. The more recent calamine brass process, which was in use until about 100 years ago, consisted in heating calamine (zinc silicate), granulated copper and coke dust in crucibles, the fusion and alloying taking place at a temperature considerably lower than the melting point of copper. I thought these two points of history might interest you by comparison and as aids to the digestion of the most recent developments.

The Theory of Dry Galvanizing.

Let us enter the dry galvanizing retort and endeavor to find out what takes place. Which guess will offer the most plausible explanation? It is an established fact that in Sherardizing the presence of zinc oxide is necessary. We might suppose, therefore, that a molecule of oxide is reduced by voltaic action when it comes into contact with the iron. The zinc attaches itself to the iron, which acts, therefore, as a cathode in electrolysis, and the oxygen travels in the opposite direction, combines with a free molecule of zinc to form a molecule of oxide, and goes through the same performance as before. I have excellent reasons, which I must keep for later publication, for believing that this hypothesis is pretty close to the truth, if not the true explanation of the action in dry galvanizing.

The outer coating is composed of reduced zinc in granular form, and the silver gray appearance may be due to slight oxidation of the surface. Whatever the true explanation may be it is of little immediate interest to practical men, but it is of great interest to scientists, who are expected to continue furnishing their abstract facts to serve as souls to the concrete bodies created by inventors. The inventors, while claiming all the credit, usually sell or lose most of it to men who put these inventions into practical use. He laughs best who laughs last, and by the time the invention has become an industry the poor scientist has been entirely forgotten, except to be occasionally dubbed a theorist, a dreamer, a simple soul, mild and childlike—for of such is the Kingdom of Heaven.

The Efficiency of Dry Galvanizing.

The efficiency of dry galvanizing, which has been proved by thorough testing, both in England and Germany, is due to its fulfilling the conditions which I have set forth in the early part of this paper. Considered merely as a covering it fits as closely as does an electrically deposited coating, and it is impenetrable because free from pores or cracks. As a mechanical protection it resists both abrasion and impact better than hot or cold work, because of the qualities of the ferrozinc alloy. Zinc itself is superior to both tin and lead in ductility and tenacity.

Considered in relation to contact effects the zinc distilled as vapor and alloyed to the iron is absolutely pure, and the span between it and the iron in the electro-motive series is, therefore, extended, as compared with a zinc containing a percentage of impurities. Its contact with the iron in the body of the alloy is as perfect as is possible. In relation to corroding agents, its granular structure offers a maximum surface for them to decompose and, therefore, increases the ratio in which the coating acts by its own decomposition as a protection to the iron.

Commercial Scope of Dry Galvanizing.

It is a noteworthy fact that, while many articles have appeared in technical and scientific journals about Sherardizing, not one word of criticism or denial of its claims has as yet been offered. I have been looking for serious criticism for some time, but when I have found doubters I have only succeeded in making new converts. The process has always appealed to scientific men because they are in position to appreciate the solid scientific foundations of its claims.

The new process has not entered the field as a competitor to galvanizing alone. In a great many instances it can take the place of coppering, of nickel plating and

* Patents applied for in all countries.

of tinning, where the articles are not to be used for the preparation or handling of foodstuffs. To these I should add the large amount of copper and brass articles, from tubing to typewriter and sewing machine parts, which are now nickel plated. An interesting point in relation to the various methods of protecting metals is the price of the metals themselves. Nickel is seven and three-fourths times, tin and aluminum seven times, copper four and one-eighth times and antimony three and one-fourth times as high in price as spelter, and at equal efficiency against corrosion the lightest coating is one of zinc as applied by dry galvanizing.

Analyzing the various items which go to make up the cost of dry galvanizing we find that in every instance there is a saving, either over the hot process or over the electric process. In most cases the saving is over both of the older processes.

Initial Expense.

A plant for Sherardizing is less expensive than a hot plant and very much less so than an electric plant. Every part of it is of a simple nature, and calls for neither feats of engineering nor the solution of any out of the way problems. It is very much like a plant for close annealing, and, whereas, the depreciation on a hot plant is usually taken at 50 per cent. per annum, the depreciation on a Sherardizing plant would not exceed 10 per cent., which is the depreciation commonly figured on an electrolytic plant. The drums are not made of perishable hard rubber or wood, as are those for electrolytic galvanizing. The process can be carried on in the main manufacturing building and the pickling done in the cheapest kind of an outhouse.

The Saving in Cost of Zinc.

For an equal thickness of coating the zinc actually deposited is about the same in value, whether derived from dust or from spelter slabs. It is less than the anodes used in electrolytic work, which have to be cast specially and are very often of odd or complicated form. Even less zinc is required than in the electric process, because an equal thickness is more effective and because the distribution is fully as even. In Sherardizing there is nothing to throw away, but sufficient dust (from 1 to 5 per cent.) is added from time to time to replace that of the weight of the articles coated which has been used. There is no equivalent to the unsatisfactory results due to using spelter recovered from dross and, therefore, contaminated by the presence of iron.

In electro-deposition an unobstructed path is required between the anode and the object for the dissociated ions of the salts in solution to travel. If any part is hidden or recessed no deposit is made, and the parts furthest from the anodes have the lightest coating. In addition to this, it must be understood that the anodes are not entirely used up, and part of them is lost at the bottom of the tank, and as eaten out remnants they cannot be used to the vanishing point.

It is hardly necessary to point out the enormous saving in the quantity of zinc used, as compared with the hot process. Hot galvanized articles have as a rule a much thicker coating than is necessary, because most of them cannot be conveniently wiped like wire or band iron. In Sherardizing all the zinc is consumed, and the thickness of deposit is regulated just as readily as in the electric process. In the hot process a large percentage of spelter is converted into dross and skimmings, and, while much of it is recovered, the net loss cuts quite a figure on the cost sheet.

The Saving in Labor.

Sherardizing is like annealing in that it requires but a small amount of labor, and that unskilled labor, placed under proper superintendence. A drum holding one or more tons of articles can be left to itself for half an hour or more, subject to an occasional turn; in the meantime another drum is being prepared for Sherardizing, while the first will be cooling. Suitable partitions will allow of several classes of small articles being Sherardized in one drum without mixing.

Hot galvanizing requires constant attention and handling, which can seldom be done by one man, even with the aid of overhead trolleys and similar fixtures. It is

not a mechanical or automatic process, but one of hard manual labor, and the regulation of temperature and methods of dipping require the attention of an experienced galvanizer. As a leading authority on hot work has written: "Considerable skill is required to bring a piece of work out of the metal and cool it so that the surface will be smooth, free from blisters and with no lumps of surplus metal attached."

For the electric process at least one man possessing some knowledge of electricity and of all the whims of electrolytes is needed. In electro-deposition irregular shapes, excepting in the case of very small articles, require regular shaped anodes, but in Sherardizing the dust, every particle of which may be considered as a minute anode in itself, is used just as it comes from the refiners for any size or shape of article.

By combining the advantages of both the old processes Sherardizing enables a manufacturer to galvanize, with one plant only, articles which have hitherto been divided between the two processes, the small ones being electro-galvanized and the large ones dipped. Less care is needed in cleaning the articles to be Sherardized, and oil or grease, far from being objectionable, is helpful to the process, because the volatile hydrocarbons help to prevent oxidation of the dust. The addition of grease or vaseline has indeed been found to be of some advantage in many cases. Furthermore, the articles can be put into the drums wet, as they come from the washing tank. The labor of recutting threads is eliminated. Bolts, screws and nuts can be put in the drum just as they are delivered from the machines, covered with oil or cutting compound.

With small installations the process can be worked intermittently. The low cost of the plant warrants a manufacturer in running a drum two or three days a week instead of sending his work out, thereby saving time, freight and jobbers' profits. The temperature required is so low and it takes very little time to start the furnace, and where gas is used this element of time may be almost disregarded. This low temperature also suggests using the waste gases of annealing and other furnaces, and in many cases it will be found economical to place a whole day's production in the retort and leave it in over night, with the night watchman to keep his eye on the pyrometer. There is no labor for skimming and drossing, no pot to scrape at unexpected times, nor furnace to destroy and rebuild at all too frequent intervals.

The Saving in Fuel and Power.

The plainest fact about hot galvanizing is its thermal inefficiency. The pot must be kept going day and night, whether in use or not, and even during its operation most of the heat is lost by radiation and by having to bring the articles to the temperature of the bath. On the other hand, power is seldom an item of any consequence, whereas in electrolytic work the amount of current consumed is quite large, for a deposit which is meant for something more than exhibition purposes or to be buried out of sight and forgotten. This is seldom appreciated because electricity is unobtrusive in its action. The cost of electro-galvanizing thin sheets is prohibitive on account of the amount of current consumed. In Sherardizing the heat is very low and is kept in by a lining of refractory material; the articles do not have to reach the temperature of the zinc dust, and the apparatus is always ready for work on short notice. The temperature does not have to be varied to suit the different sizes and classes of articles to be coated, and, as I have suggested, waste gases can be used under any circumstances.

Other Factors of Economy.

With the new process less acid is used than in the electrolytic process, because the cleaning does not have to be so thorough. The vapor works its way under specks of dirt, and bare spots cannot exist. No flux of any kind is needed, as in hot galvanizing, and there are no comparatively high priced electrical supplies to be bought.

There is no danger whatever from explosions, no broken casting nor distorted ironwork to replace, and the temper of the finest steel blades and of steel springs is in no way injured by the low temperature used. This may at first seem strange, and will not be perfectly clear

until we know something more about the temperatures existing and the reactions taking place in the retort.

Various Applications of Dry Galvanizing.

Sherardizing will not fill an uncalked seam and act as a solder. This is its one limitation, but it has a great variety of new applications to make up for it. Fly screening can be galvanized, and the business parts of agricultural implements, such as mower and harrow teeth, can receive adequate protection at a low cost without impairing their qualities.

Flashing a surface electrically to discover flaws has been in use for some years, and dry galvanizing will render the same service; it is, in fact, being used at the present time for this very purpose for boiler tubes. However, while electric flashing is worthless against corrosion, a flashing with zinc dust or vapor is very effective as a rust preventive, and of particular service for articles which are to be shipped across the ocean.

Within reasonable limits innumerable machined articles, tools, locomotive and engine parts can be flashed with zinc and be effectively protected against rust under the conditions of their operation, whereas at present they must be periodically cleaned at the expense of their appearance and of the accuracy of their fit. Articles, such as wire, tubes, &c., either flashed or coated with a heavy deposit, can be drawn out, the coating drawing out with the material itself.

A brilliant and permanent polish, which can hardly be distinguished from nickel plating, but bluer and more like silver, and a better reflector of light, can be given to Sherardized articles by means of the usual burnishing tools and machines, but unlike nickel plating it is absolutely rustproof. This polish is not temporary like that of electro-galvanizing, and it is hard and durable if worked down, as it should be, to the ferrozinc. The reason that it does not whiten by corrosion, as might naturally be expected, is because the surface has flowed to an impervious film and the iron is shielded from any contact effects.

In this connection it should be remembered that highly polished steel is relatively rustproof. If, however, nickel plating is preferred, a light Sherardizing before plating, instead of coppering, will insure very thorough adherence of the nickel to the ferrozinc, and superior rustproof qualities will be obtained. It has been shown that it is very difficult to volatilize zinc from alloys when there is any nickel present.* Sherardized aluminum can be electroplated and the objectionable soft surface be overcome, not to mention the finish and appearance.

Sherardizing has been found to protect silver from sulphuretted hydrogen, which blackens it; it can be applied very lightly before polishing without altering the color. When aluminum has been Sherardized it can be readily soldered. This is expected to do away with the very unsatisfactory riveting of articles made from aluminum sheets. The latest application is for inlaying or damascening, and this art is being carried out in England on a commercial scale. A variety of colors can be obtained by using different dusts and by varying the time, thereby obtaining alloys of different tints. The designs shade off in a pleasing manner beyond the edges of the stopping off material, which acts as a stencil in setting graphical limits to the action of the dusts and vapors.

It is very seldom that in the history of invention we find an improved process which corrects so many defects, removes so many limitations of the processes in use and creates so many new and novel applications as does dry galvanizing.

(Concluded.)

The United Steel Company, Canton, Ohio, is now making vanadium steel in a commercial way in its 50-ton basic open hearth furnaces. It recently made a heat of about 30 tons, which is claimed to be the largest heat of this class of steel thus far made either in this country or abroad. The company is prepared to furnish vanadium steel in ingots, billets, slabs, sheet bars and plates from 15 to 40 in. wide, or can make arrangements to have such steel rolled by other mills into the different shapes and sizes which it does not roll.

* See A. R. Haslam in *Chemical News*, Vol. 51.

The Mechanical Engineers' Meeting.

INDIANAPOLIS, IND., May 29, 1907.—(By Telegraph.)—The opening of what promises to be one of the most interesting midyear conventions of the American Society of Mechanical Engineers took place Tuesday evening, May 28, in the parlors of the Claypool Hotel, at about nine o'clock.

An address of welcome was made by Mayor Charles Bookwalter, who extended the hospitality of the city to the visitors, assuring them that a Hoosier reception involved no offering of the city's keys as there is nothing locked against visitors. He wished for the society a very pleasant stay, and trusted it would find the city's various industries and interests the subjects of profitable investigation.

Responding for the society, the president, Prof. F. R. Hutton, thanked the mayor and mentioned as one reason for selecting Indianapolis as a meeting place that it was not only the center of the State, but the center of the population of the country, and while the bulk of the society's membership is still east of the Allegheny Mountains it is extending westward and the geographical center is becoming more and more an appropriate place of convening.

Secretary Calvin W. Rice read a few announcements concerning excursions and modifications of the previously prepared programme, which was printed in *The Iron Age* May 9. The remainder of the evening resolved itself into an informal social reunion of the members and their hosts and guests.

The second session convened in the same room on the following morning. Attention was first given to business matters, including the report of the tellers on the election of members. The balance of this session was professional in character, and was occupied with the presentation and discussion of the reports and papers scheduled for this time in the programme previously printed.

Plans have been prepared by the Local Committee for excursions Wednesday afternoon to the Atlas Engine Works, the National Motor Vehicle Company, Nordyke & Marmon Company and the Parry Mfg. Company.

Wednesday evening the second professional session was devoted to papers on subjects pertaining to automobiles, the titles and authors of which have already been given in these columns. A more complete report of these and the morning's papers, with those yet to be given, will appear in the next issue of *The Iron Age*.

Up to the time of going to press the registration of members and guests had reached 193, and it is believed that the final registration will exceed 250, and possibly reach 300 or over.

A general strike of the machinists in the employ of the Erie Railroad has been declared in the shops of the road from Jersey City to Chicago. In all the officials of the union said that 3000 men had quit work. The dissatisfaction of the Machinists' Union with the piece work system, which prevails in the shops of the Erie Railroad, is at the bottom of the strike. Officials of the railroad company say that the strike is not a serious matter, as many of the men either refused to go out or have since returned to work. The strike was declared as part of a plan to enforce the union's demands on all railroads.

Chicago press dispatches state that after three years of constant struggle, representatives of railroads and manufacturers on May 25, at a meeting in the rooms of the Illinois Manufacturers' Association, agreed upon a uniform bill of lading. An effort will be made to have its provisions enacted into a Federal statute, thus making it obligatory on all roads in the country to adopt the same form. The commercial interests gained nearly every point they contended for, especially the elimination of the 20 per cent. insurance clause. The new bill will be a negotiable paper.

The Cambria Steel Company, Johnstown, Pa., is pushing work on its new No. 8 blast furnace, which is expected to be ready for blast in August.

Connecticut Industrial Stock Prices.

Connecticut industrial stocks, as listed at Hartford, are standing well up to where they were the first of the year, and this in spite of large increases in capitalization. In a few instances there has been a slight falling off of prices bid, but these are nearly offset by gains in other stocks. An average of 13 stocks in metal lines shows a decline from \$140 to \$137.50, which is very small indeed considering the general condition of stocks. It goes to indicate that manufacturers have felt no cessation of business, for industrials are quick to respond sharply to adverse conditions, and a few points on an average probably mean in this instance increased capitalization in meeting growing demand for goods rather than anything else. It is quite likely that had capital stocks remained where they were prices to-day would average as high as ever, and perhaps higher.

According to press dispatches, American Brass Company, Waterbury, has advanced from \$133 to \$148; American Hardware Company, New Britain, remains steady

A New Eberhardt Brothers Spur Gear Cutter.

The ability to cut large and extra long gears, and to cut them rapidly by using high speed steel cutters, are the more important features of the new No. 5 automatic spur gear cutting machine built by the Eberhardt Brothers Machine Company, Newark, N. J. The machine, illustrated in Fig. 1, is capable of cutting spur wheels up to 60 in. in diameter, 16 in. face, $2\frac{1}{2}$ diametral pitch in steel, and 2 diametral pitch in cast iron. The unusual length of face is provided for by the long cutter slide construction, and the arrangement of the frame, which allows the cutter to cut up close to the column. The spindle bearing is in the center of the slide, and the draw cut principle is used, the feed screw being under tension when feeding or returning the slide, so that the latter is drawn and not pushed. This long slide construction eliminates chance of the cutter slide lifting or the parts chattering while the cutter is entering the work.

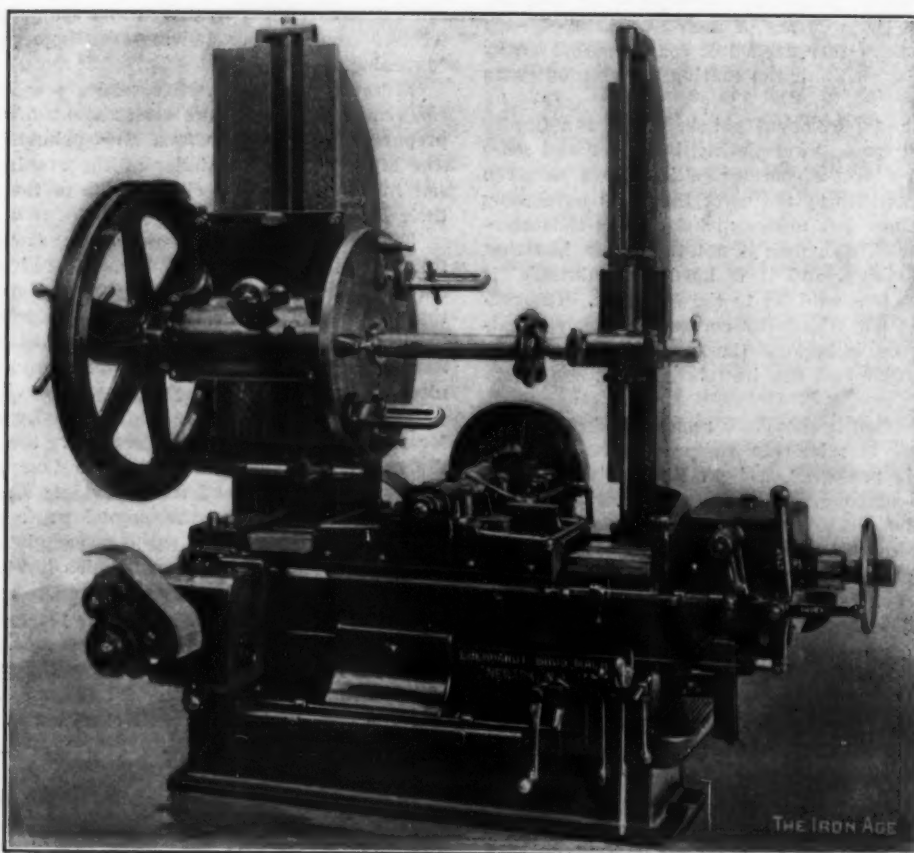


Fig. 1.—The New No. 5 60-In. Automatic Spur Gear Cutter Built by the Eberhardt Brothers Machine Company, Newark, N. J.

at around \$115; the Billings & Spencer Company, Hartford, has advanced from \$40 to \$45; the Colt's Patent Firearms Mfg. Company, Hartford, from \$75 to \$76, the Eagle Lock Company, Terryville, from \$72 to \$75, the par value being \$25; The Pratt & Whitney Company, Hartford, remains steady at about \$100; Landers, Frary & Clark, New Britain, has declined from \$76 to \$72, par value \$25; Peck, Stow & Wilcox Company, Southington, from \$57 to \$52, par value \$25; the Pratt & Cady Company, Hartford, from \$180 to \$175; the Whitlock Coll Pipe Company, Hartford, from \$205 to \$185; the Collins Company, Collinsville, from \$168 to \$160; the Johns-Pratt Company, Hartford, from \$385 to \$375.

Chairman E. H. Gary of the Board of Directors of the United States Steel Corporation, says there is no foundation for the report that the plant of the Illinois Steel Company is to be removed from South Chicago to Gary, Ind., or that the South Chicago plant is to be abandoned.

A spur gear drive, as shown in Fig. 2, has been adopted, because it is the most efficient and is especially advantageous for the high spindle speeds employed with the high speed steel cutters, where a worm gear drive would waste considerable power and wear out sooner. A good test of the drive and feed mechanism was shown in the cutting of gears of 3 diametrical pitch in 0.30 carbon steel, 5-in. face, from the solid, using a roughing and finishing cutter side by side, at a feed of $4\frac{1}{2}$ in. per minute. These cutters were regular carbon steel cutters; had they been high speed steel the speed and feed could have been increased.

A new feature which is being embodied in these machines is a double train of feed gears, whereby double the range of feed usually provided for is obtained without extra change gears. This mechanism is operated by a sliding double gear, moved by a handle, so that with any one pair of feed change gears in place two feeds can be obtained. These are so arranged that one feed is suitable for the first cut, when using a finishing cutter and one or more roughing centers in a gang, while the other feed is suitable for the successive cuts and is effected by

simply sliding in the back gear. When the gear is finished and the next blank is in place, the slow feed is resumed by again shifting the back gear.

The feed changes range in geometrical progression from $\frac{3}{4}$ to 15 in. per minute. As the cutter speeds range from 20 to 128 rev. per min., the new feed arrangement allows the use of high speed cutters to advantage, inasmuch as fast feeds can be used, which would be difficult to obtain in the usual range of feed changes. The feeds and cutter speeds are independent, one being changed without affecting the other.

The index wheel is of large diameter and is made of two parallel disks, hobbled in place, and the disks rotated with respect to one another between successive cuts, so as to give the highest accuracy possible. The indexing mechanism is positive, employing a locking disk, operated by a small clutch. At the end of each indexing the disk makes one or more full turns, and is locked in position without depending upon its momentum. Change gears are provided to cut all numbers of teeth from 10 to 100, and all from 100 to 400, including multiples of the prime number change gears, but excepting the prime

tion facilities by the completion of the double tracking of the Naugatuck Division of the New York, New Haven & Hartford Railroad, an improvement long needed, for the valley has an immense volume of freight, which has at times been so congested as to cause serious inconvenience.

A Nova Scotia Steel Company Buys a Brazilian Ore Deposit.

The following special dispatch from Halifax, Nova Scotia, to the *Toronto Globe* would indicate that one of the steel manufacturing companies of the Province is looking to outside sources for ore:

The Nova Scotia Steel & Coal Company has purchased a large deposit of iron ore in Brazil. Harvey Graham, one of the directors of the company, has sailed for Liverpool, en route to Rio de Janeiro, to close the deal. He was accompanied by his solicitor, J. L. Jennison, New Glasgow. Last year the company sent an expert to examine the property, which is situated in the interior of Brazil, 100 miles from a railroad. His report was so

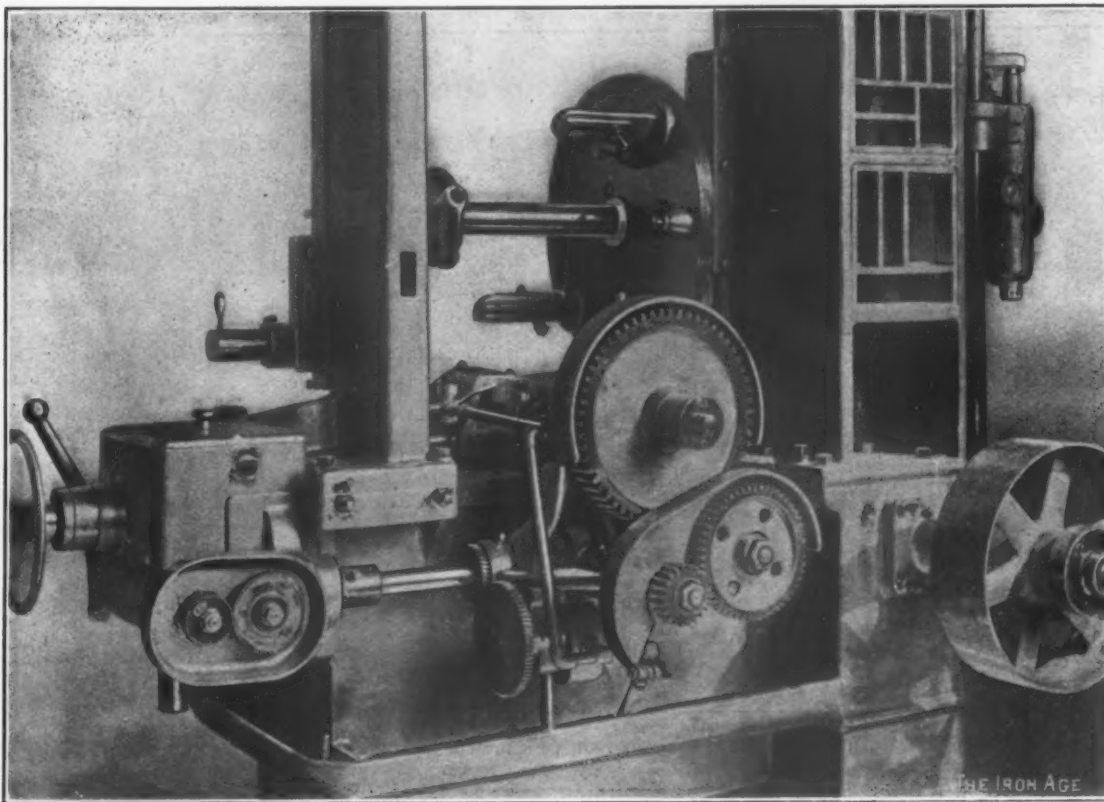


Fig. 2.—Rear View of the No. 5 Automatic Spur Gear Cutter, Showing the Drive and Feed of the Cutter Spindle.

numbers over 100. A large number of divisions over 400 can also be made.

During indexing the indexing mechanism automatically locks the feed, so that the cutter slide cannot feed until the division is completed. Similarly, the feed is interlocked with the indexing mechanism, so that the latter cannot index while the slide is feeding. The levers for engaging and disengaging the feed and for indexing by hand are placed on the operating side of the machine to facilitate the setting. After the machine is set it goes through the feeding, returning at a constant fast rate, and the indexing, all entirely automatically, without any attention on the part of the operator.

The cutter spindle and removable type of cutter arbor are hammered tool steel forgings, and the large work spindle is machinery steel. All shafts and spindles are accurately ground, and all running bearings are fitted with bushes. The flat bearings and slides are scraped to standard surface plates.

The many important industries of the Naugatuck Valley, Connecticut, have been relieved in their transporta-

favorable that steps were taken to acquire the property. The deposits are said to be among the richest known in the world. The Nova Scotia Company also first developed the iron deposits at Belle Island, N. F., and the success of that venture was the foundation of the company's prosperity.

The annual meeting of the Angeline Dock Company, an identified interest of the Jones & Laughlin Steel Company, Pittsburgh, owning ore docks in Ashtabula Harbor, Ohio, was held in Pittsburgh last week, at which the following officers were elected: B. F. Jones, Jr., president; W. W. Willock, vice-president; W. W. Moore, secretary and treasurer; W. G. Pollock, general manager; Executive Committee, B. F. Jones, Jr., W. W. Willock, G. M. Laughlin, H. A. Laughlin, James B. Laughlin, W. C. Moreland and H. S. Kiehl.

The headings of the north tube of the Belmont tunnel, under the East River between New York and Long Island City, met May 16.

Another All-Steel Postal Car.*

By interposing an unburnable barrier between the locomotive and coaches, an all-steel postal car is a protection to an entire train. More particularly the car itself is protected against telescoping and its rate of deterioration is reduced. The illustration shows the all-steel postal car No. 4097, just turned out by the Southern Pacific Company's Sacramento shops, the design of which is entirely original with the company's motive power department.

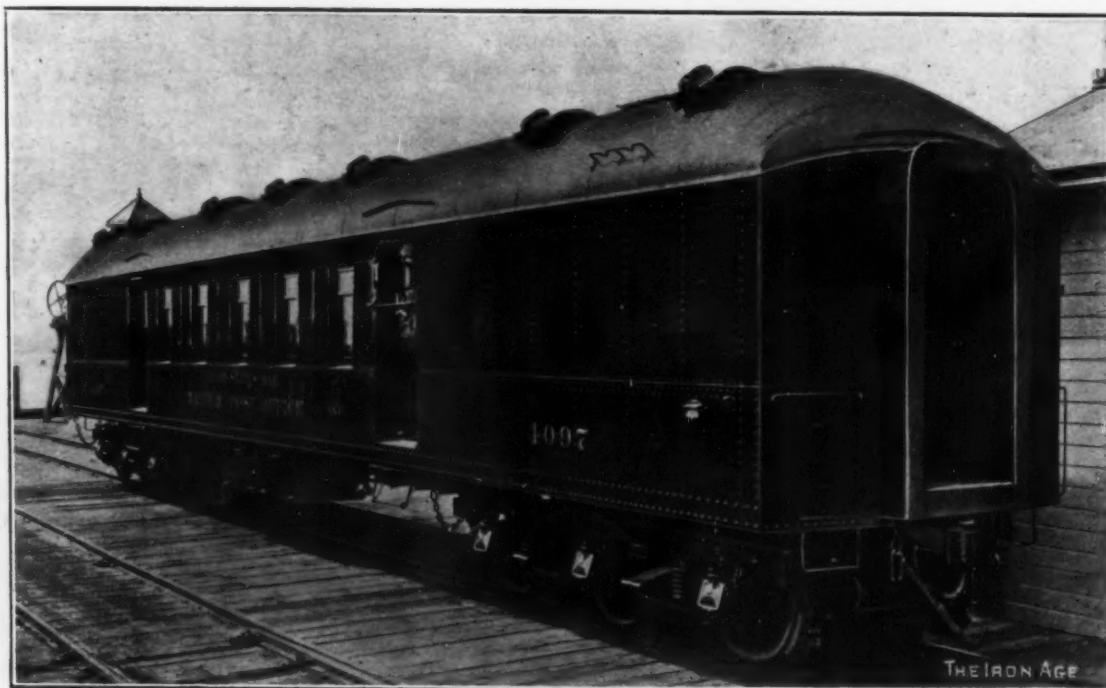
The principal features of the framing of the car are two 12-in. I-beams weighing $31\frac{1}{2}$ lb. per foot and extending through the buffer beam. On account of the depth of these beams platform sills or draft timbers are not necessary, the draft gear being made secure to the lower flanges of the I-beams. These I-beams offer twice as much resistance to shock as do the wooden sills of an ordinary car. They are trussed with two $1\frac{1}{2}$ -in. rods, which extend through steel castings in the end sills. The flooring consists of two courses of corrugated steel laid crosswise of the car, with a layer of hair felt between and topped with monolith to provide a smooth floor surface.

radially on the roof, the openings of which can be regulated to suit the temperature of the car. The usual gas lighting system has been eliminated and electric lights supplied from storage batteries and an axle generator substituted. Steam furnished by the locomotive is used for heating the car, and the supply is automatically controlled to regulate the temperature. For emergency use an ordinary stove is placed in one corner.

In design the entire framing is so completely bound together that the most severe shock will tend to buckle the entire framing, but will render it impossible to telescope the car.

The Saxon Vertical Cylinder Grinder.

For very accurate internal and external cylindrical grinding it is contended by the Saxon Machine Company, Holyoke, Mass., that a machine with a vertical grinding spindle is much superior to one of horizontal type, hence the evolution of the vertical cylinder grinder illustrated. It is adapted for the internal grinding of gas and gasoline engine cylinders, air compressor cylinders, or any holes which must be finished true and in exact alignment,



An All-Steel Postal Car of New Design for the Southern Pacific Railroad.

The roof is elliptical in shape and is without the usual upper deck. The roof framing consists of 5-16 x $1\frac{3}{4}$ x 4 $\frac{1}{2}$ -in. angle irons, elliptically bent to conform to the roof. A foot at either end of these angle irons is riveted to the side plates of the car. The outer roof lining is 1-16-in. sheet metal, extending down the side plate angle, and is overlapped by the $\frac{1}{8}$ -in. steel plate forming the letter board sheet. The inside roof sheets are 1-16-in. steel sheets, flanged on the edges and riveted, through the angle iron column, forming panels 2 ft. wide. Asbestos is used for lining the sides and ends of the interior, while the ceiling is of steel plate. The floor is covered with a fireproof cement and all interior fixtures are either iron or brass. The only wood used is in the window sashes. As shown in the engraving, the entire outside is of riveted steel plates. The ends of the car framing are composed of rectangular plates, $\frac{3}{4}$ x 3 in., to which heavy angles are riveted, and extend from the end sill to the top of the car frame, where they are substantially secured. The door framing is constructed of two heavy angles to give additional strength. To take up any heavy shocks on the end frame a 5-16-in. steel plate, 20 in. wide, is riveted across the top framing of the car.

Ventilation is provided by Cottier ventilators placed

* One built by the Pennsylvania Railroad Company was described in *The Iron Age* April 18, 1907.

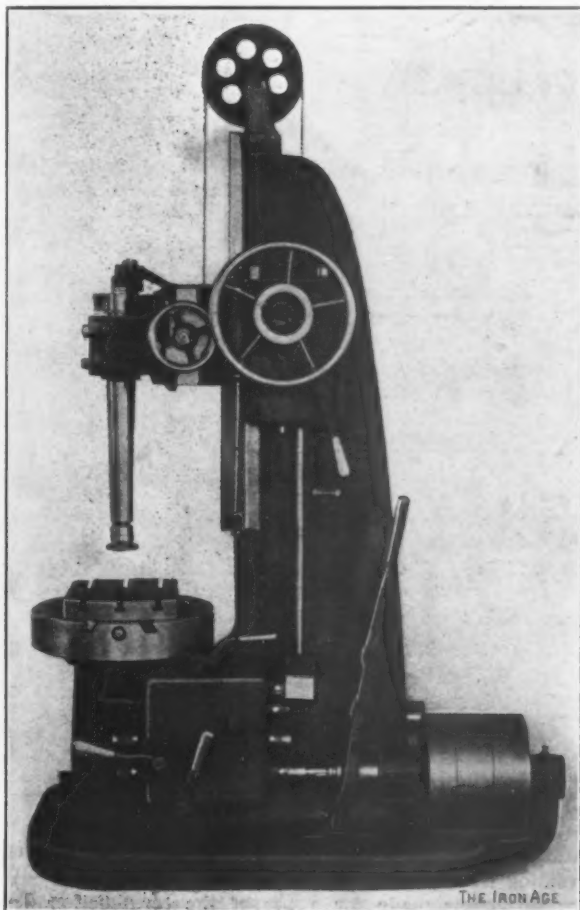
and also for the external grinding of pins, bushings, pistons and the like. On internal work the machine has a capacity of 13 in. in diameter x 18 in. deep, and on external work 6 in. in diameter x 18 in. long.

The machine has some of the characteristics of a vertical boring mill with respect to its movements, with the addition of means for rotating the spindle where a tool in the boring mill is ordinarily held stationary. The column supporting the grinding head and face plate is made especially strong and rigid, and the bearing surfaces of the cross rail and face plate are exceptionally large. To give the desirable changes of speed for different classes of work gear boxes are provided. One special advantage of this type of cylinder grinder is that the position of the face plate expedites the setting of work and makes it more easy to secure it, since its weight is not a factor.

The main frame is a single casting, comprising a base for the face plate and a column for the cross rail. The face plate is mounted on top of the base in a bearing protected from dust. There are two forms in which the face plate is furnished, in one of which there are two sets of three T-slots at right angles to one another and one as illustrated, arranged to slide, and having three T-slots in one direction. The face plate has eight speeds, ranging from 7 to 41 rev. per min. With the sliding table

the grinding of duplex cylinders or similar work is accomplished more quickly, as it is not necessary to reset the work. The table is locked rigidly in any position by a clamp.

The crucible steel spindle is accurately turned and ground and is carried by a sliding head attached to the cross rail. It is driven from the vertical shaft at the side of the grinder. The bearings are of special metal and are adjustable and protected from dust. The massive grinding head is moved on the cross rail by a screw having a dial graduated to thousandths of an inch and the cross rail is raised and lowered on the column by the large hand wheel. An automatic vertical travel of the cross rail is set in action when grinding and is controlled by a reversing rod actuated by dogs, allowing for various ranges of action. The travel may also be reversed by hand with a lever provided for that purpose. Six different rates of travel are possible for each speed of rotation of the work, these varying from 1-32 to 5-16



The No. 50 Vertical Cylinder Grinder Built by the Saxon Machine Company, Holyoke, Mass.

in. The cross rail is heavy and strong and is attached to the column with bearings 29 in. long. The rail and head are counterbalanced. Dust covers are provided where needed, for the protection of the working parts.

The driving shaft is fitted with tight and loose pulleys and is driven directly from the main shaft, no countershaft being required. When desired a direct current motor is furnished, which can be directly connected to the grinder. All operations are controlled from the one side, that shown at the front in the illustration. An attachment for the use of water, and exhaust fans for removing dust, are included in the regular equipment, when so ordered.

The machine is usually equipped with a grinding wheel $3\frac{1}{2}$ in. in diameter by $\frac{3}{8}$ in. thick, and is driven at a speed of about 5500 rev. per min. The vertical travel of the head is $19\frac{1}{2}$ in. The face plate is 20 in. in diameter. The sliding table is 16 x 12 in. The machine has a greatest height of 88 in., is 60 in. from front to back and 40 in. wide. Its net weight is about 3250 lb.

The special advantages claimed for the machine are

that there is no springing of the grinding wheel away from hard spots or digging in in soft spots, which would result in high and low spots that would allow the leakage of gas past the piston in the case of a gas engine cylinder. Neither is there any tendency for thin walls to spring nor any tendency of a deflection of the wheel from the port holes. The fact that the work is rotated when grinding results in the greatest possible accuracy, especially hard to obtain where the work is of an unbalanced nature. The grinding saves the expense of a finishing cut and reaming, and produces a fine and accurately finished surface.

Proposed Amalgamated Scales.

The Amalgamated Association concluded its sessions at Toledo, Ohio, last week and formulated scales for the year beginning July 1, for various iron rolling mill operations; also sheet and tin plate mills. Advances, which average about 10 per cent., have been asked in these scales.

For piles on boards and busheling on sand bottom the workers propose advances in wages graded according to 1-20 cent advances in bar iron, instead of 1-10 cent advances as at present. In the case of piles on boards the \$1.57 basis (per ton of 2240 lb.) for 1 cent bar iron is retained, as are all the increments corresponding to 1-10 cent advances in bar iron; but there have been inserted intermediate figures all the way up to 2 cents, so that the worker's pay will be advanced when bar iron goes up \$1 a ton instead of \$2, as at present. In the scale for busheling on sand bottom, in addition to the intermediate 1-20 cent intervals an advance of 5 cents is made all along the line, the base being \$2.10 on 1 cent bar iron instead of \$2.05.

Similar changes by the insertion of prices by 1-20 cent intervals appear in the scales for knobbling and for heating slabs and shingling. All the present prices for 1-10 cent intervals are retained—namely, \$1.60 for scrap and \$5.59 for refined iron in the knobbling scale and 71 cents for shingling muck iron and rehammered iron in the heating slabs and shingling scales. These figures are for 1 cent bar iron.

The bar and 12-in. mill scales show advances of about $7\frac{1}{2}$ per cent. on present rates, besides providing advances according to 1-20 cent intervals. The proposed and present lists compare as follows, on 1 cent bar iron: Heater, 59.7 cents, against 55.5 cents; roller, 41.1 cents, against 38.2 cents; catcher, 22 cents, against 20.5 cents; rougher down, 18.1 cents, against 16.9 cents; rougher up, 18.1 cents, against 14.1 cents. When working pipe or skelp the roller would get 37 cents under the proposed scale, as against 34.4 cents. Plate and tank mill prices are unchanged. In the scales for guide, 10-in. and hoop and cotton tie mills an advance of $7\frac{1}{2}$ per cent. was made on all present prices.

In the scale for sheet mills a radical change has been made in that all prices are based on an output of 1000 lb., while at present they are based on 2240 lb. Another change is that whereas the present scale stipulates the total cost of rolling, the new scale distributes the cost among the different workers. The advance is apparently something more than 23 per cent. For No. 8 gauge and heavier the present scale makes the price \$2.95 for 2240 lb. The proposed scale for No. 8 and heavier gives the roller 40 cents; the heater, 33 cents; the shearman, 19 cents; the rougher and catcher, 17 cents each; the pair heater, 13 cents; the matcher, 12 cents, and the doubler, 11 cents. The total is \$1.62 for 1000 lb., equivalent to \$3.63 for 2240 lb., or an advance of 68 cents per gross ton. The basis is the same as at present—2.30 cents for the average selling price of Nos. 26, 27 and 28 gauges, plain sheet steel, with 2.6 per cent. advance or decline for each change of 1-10 cent in the selling price.

In the tin plate scale the roller, doubler and shearman are advanced 6 per cent., screw boy 9 per cent., heater and catcher 16 per cent., above prices paid in the present scale. The sheet and tin bar scale was adopted without change, except in one footnote.

In the various other scales referred to above a number of footnote changes were made.

The Johnson Blast Furnace Distributer.

A recent addition to the list of patented devices designed to supply a charge at a given place at the top of a blast furnace burden is a distributor devised by Guy

with the crossbar *i*, operates the chains so as to close or open the bottom of the spout.

The valve *b* at the upper end of the spout is a cap of dished disk form suspended from the lever *n*. The vertical motion of this cap of the spout is provided for by the cylinder *p* and the lever *n*, and its sole function is to act as a gas seal for the upper end of the spout when the lower end is opened to drop the charge into the furnace. After the spout has been filled by the skip the seal *b* is lowered to close the upper end. The spout is then revolved to the desired degree and the bottom opened, the stock dropping to the required place.

To prevent the dislodging of the device when slips occur, the inventor has provided clips *o*, which may be bolted to the top plate, the upper ends overlying the

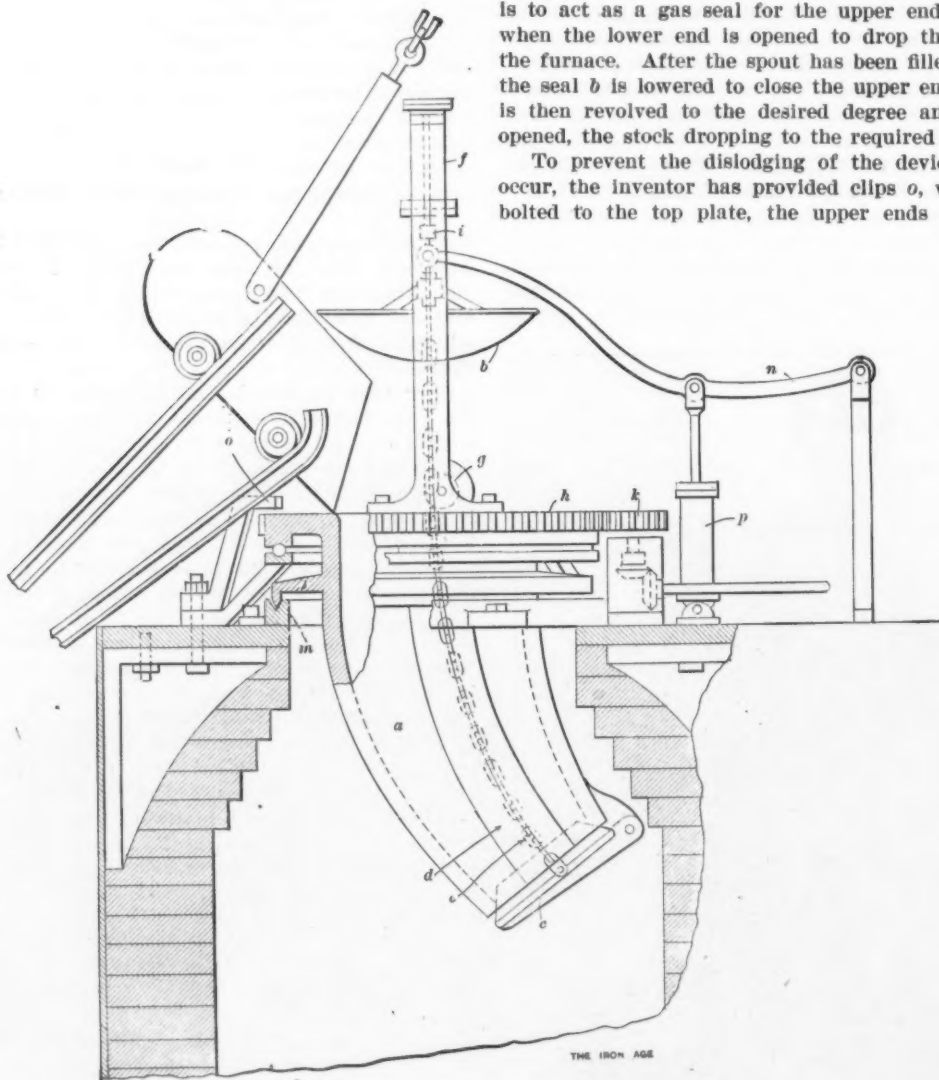


Fig. 1.—The Johnson Blast Furnace Charging Apparatus and Distributer.

R. Johnson, vice-president and general manager of the Alabama Consolidated Coal & Iron Company, Birmingham, Ala. It represents a marked departure from the common form of top construction. In brief, it consists of a revolving charging spout of tubular form and longitudinally curved, having valves at top and bottom corresponding respectively to the upper and lower bells of the more familiar tops. The construction and method of operation are indicated in the accompanying illustrations in a way that requires no great detail of description.

Fig. 1 shows in section a furnace top embodying the Johnson device. Fig. 2 is a sectional top plan view of the gear, standards and other parts. The charging spout *a* has for its top the annular gear *h*, and the revolution of the gear and spout is facilitated by the use of ball bearings as shown. A gas seal is formed by the annular flange *l* and the ring *m*, which is bolted to the top plate of the furnace. The upper valve *b* of the spout and the lower valve *c* have important functions in the operation of the apparatus. The lower valve is hinged and is inwardly tapered so as to fit tightly the bottom of the spout. On the outside of the spout are two parallel pipes *d*, carrying chains *e*. The lower ends of the chains are connected to the bottom valve and they pass over guide pulleys sustained by standards *g* rising from the gear *h*. The cylinder *f*, through the connection of its piston

geared head *h*, but not being in contact with it, thus avoiding friction.

The claims made for a top of the construction described are that it is much lighter and more easily oper-

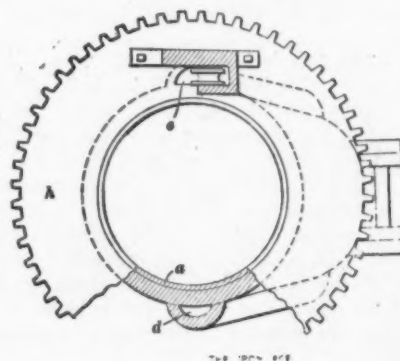


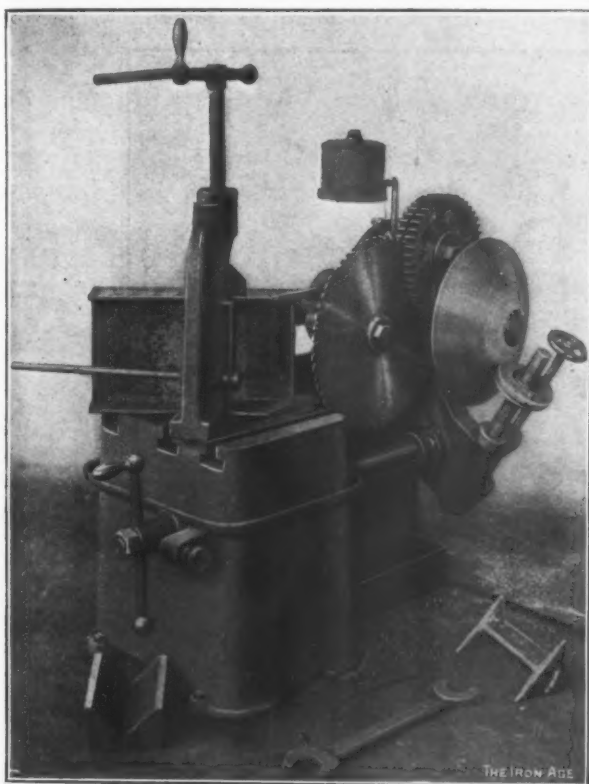
Fig. 2.—Top Plan View of Gear and Standards.

ated than the familiar bell and hopper construction, that it charges the coke with less breakage and while giving good distribution of the stock avoids much of the difficulty and loss of time involved in making repairs of apparatus commonly used.

A New Q. M. S. Metal Saw.

For the many small shops that are not warranted in purchasing a large and relatively expensive metal cut off saw the Quincy, Manchester, Sargent Company, New York, has recently added to its line a somewhat smaller machine than those it has been manufacturing. The accompanying illustration shows this new No. 1-M metal saw, which, while embodying the strength and wearing qualities of the regular line, can be placed on the market at a moderate price.

The manner of driving the blade is entirely different from any other now in use. The blade, as on the company's Bryant type of machine, is driven from the periphery, but instead of a sprocket drive, hardened and ground steel rollers are used, which are journaled in removable steel bushings held securely in the double driving gear. By this means of driving a much larger diameter of the blade is available for cutting than can be



The No. 1-M Cut-Off Saw Made by the Quincy, Manchester, Sargent Company, New York.

obtained from a blade of the same size arbor driven, where about one-third of the diameter of the blade is necessarily occupied by the driving collars. It has also an advantage of economy in repairs, as a broken or worn collar can be easily replaced.

A radial T-slot is cast in the side of the carriage, and the double gear containing the saw driving rollers is journaled on a stud held in this slot. All that is necessary to take up the wear of the saw blade is to loosen the stud and lower the double gear until the rollers properly mesh in the saw blade. The shears and carriage are constructed with the gib on top of the ways, with no strain other than keeping the carriage in position. All strains come on the ways underneath, on the same principle as the saddle on a planer rail. This arrangement makes the machine very rigid, and there is claimed to be absolutely no vibration.

The machine has a capacity for cutting rounds up to 6 in. in diameter, squares 6 x 6 in., and I-beams (in a vertical position) up to 10 in. The front of the table is of sufficient size to enable beams and channels to be properly supported when being cut off at any angle up to 45 degrees, and is placed at a distance below the axis of the saw blade equal to about one-half the height of the largest shape the machine is listed to cut, which can

therefore be placed most advantageously for cutting it in a vertical position with a minimum distance of blade travel.

The feed is of the variable friction type, adjustable from 3-16 to 1 in. with the machine in motion. It is powerful and continuous in its action throughout its entire range and is considered greatly superior to a ratchet feed, which necessarily is intermittent in its action. The friction wheel shaft has a hardened feed worm and roller bearings fastened to it, meshing in a bronze worm gear that is threaded to receive the feed screw. The feed screw is held stationary by a latch pin and the worm gear revolves around it, advancing the carriage while cutting. To return the carriage the latch pin is raised and the carriage returned by hand. This stationary feed screw lends greatly to the simplicity of the machine, enabling the elimination of a feed nut and all clutches and levers.

The saw arbor is made from tool steel, hardened and ground to a standard size. The bearings are all bronze bushed or babbitted.

The following are the more important dimensions:

Diameter of saw blade, inches.....	18
Thickness of saw blade, inch.....	$\frac{3}{16}$
Travel of saw blade carriage, inches.....	10
Speed per minute of blade, feet.....	35
Maximum depth of cut, inches.....	$6\frac{1}{4}$
Height from table to saw axis, inches.....	5
Diameter of driving pulley, inches.....	16
Width of driving belt, inches.....	$3\frac{1}{2}$
Revolutions per minute of main driving shaft.....	130
Length of front table, inches.....	14
Width of front table, inches.....	18
Width of machine over all, inches.....	$33\frac{3}{4}$
Length of machine over all, inches.....	$60\frac{1}{2}$
Height of machine over all, inches.....	$50\frac{1}{2}$
Weight on skids, approximately, pounds.....	1,500

Each machine is furnished complete with two saw blades, stop gauges to cut duplicate parts, V-block to properly center largest diameter round the machine is listed to cut, clamp bracket of sufficient size to hold any material up to the capacity of the machine, and the necessary wrenches. When desired the machine will be furnished arranged for direct connected motor drive.

Huge Generator and Gas Engine Orders.—The largest single order for alternating current generators ever placed in this country has been awarded by the United States Steel Corporation to the Allis-Chalmers Company, Milwaukee, Wis. The order was for 32 gas engine driven generators, aggregating 68,000 kw. of power. Of these generators 16 are to be installed in the Indiana Steel Company's new plant at Gary, Ind., and the other 16 are for the Homestead plant of the Carnegie Steel Company, the South Chicago and Bay View works of the Illinois Steel Company at Milwaukee and for the Central furnaces of the American Steel & Wire Company, Cleveland, Ohio. The generators are to be Allis-Chalmers standard type and will be directly connected to Allis-Chalmers twin tandem gas engines. The Allis-Chalmers Company has also booked orders for 36 gas engines of 4000 hp. each, 25 of which are to be installed at Gary, seven at the Homestead plant of the Carnegie Steel Company and four at the South Chicago plant of the Illinois Steel Company. This is also said to be the largest gas engine order ever placed by one interest.

The Woodward Iron Company, Woodward, Ala., is equipping its No. 2 furnace with a new skip incline and an improved, automatic Baker & Neumann distributing top, and David Baker of Philadelphia has recently closed with the Alabama Consolidated Coal & Iron Company for a similar equipment, to be applied to its No. 1 Ironaton Furnace. These improved distributors are exceedingly simple in construction and give rotary distribution automatically without the use of ball bearings, gears or motors.

J. H. Hamilton has resigned as sales agent of the Pittsburgh Steel Company, at St. Louis, Mo., and has opened an office at 403 Security Building, that city, as manufacturers' agent.

The Niagara Falls Power Company's Report.

D. O. Mills, president of the Niagara Falls Power Company, in his report to stockholders for the year ended December 31, shows that the surplus after charges was \$336,687, which is equal to 8.03 per cent. earned on the \$4,181,200 capital stock. The income account is as follows: Gross earnings, \$1,370,308; operating expenses and reserve (\$100,000), \$326,124; net earnings, \$1,044,184; other income, \$79,400; total income, \$1,123,584; charges, \$786,897; surplus for year, \$336,687; previous surplus, \$62,534; profit and loss surplus December 31, 1906, \$399,321.

President Mills says in part: "This company now has available for power generation on the American side of the Niagara River two complete plants with an aggregate capacity for an output of about 77,000 electrical horsepower and a considerable reserve in power generating machinery; an additional capacity of about 8000 hp., of which, under leasehold rights, 7500 hydraulic horsepower

The Manufacture of Sandless Castings.*

BY JOHN H. SHAW, NEW HAVEN, CONN.

Casting in so-called chills is a method well known at the present time. Outside of the making of rolls and ingot molds, we find it used for making bedsteads, sash weights and other simple castings where there is no difficulty from undue expansion and contraction. The troubles arising from an iron mold and the lack of understanding of the regulation of temperature in casting have caused many a failure of an otherwise good idea. These objections have been largely overcome by the construction of a peculiarly arranged mold, such as those shown in Figs. 1 and 2, which are used in casting brake shoes. The parts of the mold are so arranged that they automatically open out sufficiently to take care of the expansion due to heating up without destroying the correctness of the castings made.

The mold is constructed essentially in two parts: the

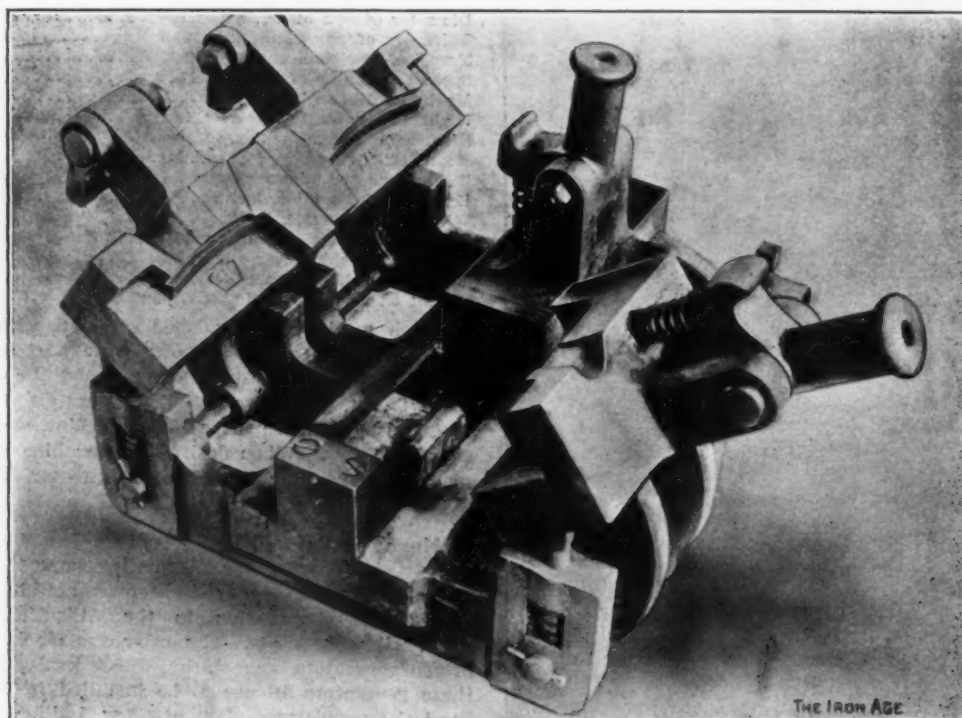


Fig. 1.—Iron Molds for Keystone Brake Shoe.

is now being generated in installations of tenant companies, and on the Canadian side of the Niagara River a plant with installation for a continuous output of 40,000 electrical horsepower, one 10,000-hp. generating unit being held in reserve. From the combined output of these plants about 95,000 electrical horsepower and 7500 hp. (leasehold hydraulic rights) now are yielding revenue. Contracts have been negotiated for the sale of additional amounts of electrical power deliverable upon the completion of the installation of the necessary apparatus. It is expected that before the close of 1907 substantially all of the combined output of these plants will become revenue producing. Firm contracts now in force covering long terms will require a considerable part of this power. The remainder, it is believed, will be absorbed quickly by the users of our power steadily increasing in number and requirements. The financial condition of the company never has appeared to be more satisfactory and promising."

The district managers of the Westinghouse Machine Company held their annual meeting at the general offices of the company at East Pittsburgh last week. The sessions were devoted to the discussion of matters pertaining to gas and steam engines. The meetings were concluded with a banquet, the company acting as host.

outer shell, which may be locked readily, and the inner dies in close contact with the shell and securely fastened to it. The design of the mold is such that expansion in two directions may readily take place unimpeded except for powerful springs. The arrangement of dies and shell allows of a ready replacing of the former when damaged, this depending upon the thickness of the mold and the temperature they are allowed to reach, their composition of course being such that a high melting point is attained. Further attention is given to the molds in designing them so that they may be closed and opened very quickly, and thus rapid work accomplished.

In operating a sandless mold it is necessary occasionally to coat the metal in contact with the molten iron with a compound containing graphite and crude oil or other refractory substance carried in a vehicle which in being driven off by heat will not ruin the surface of the casting. In operating the mold, after spraying it, the first few castings are rejected, the intention being to heat up the mold, though in continuous work this may be accomplished in a special heating furnace or oven if desired. Any cores required are set in the regular way before casting. The metal is poured in rapidly, and the mold opened as quickly as may be, provided that the

* A paper read before the American Foundrymen's Association, Philadelphia, May 22, 1907.

metal is set sufficiently that no bleeding takes place. The elastic condition of the mold, however, prevents trouble if this time is not kept properly, and the casting allowed to remain in the mold too long. When the castings are taken out they are piled up for the whole mass to cool slowly, so that the chilling effect of too quick cooling may not cause hard spots. The molds should not be allowed to get too hot—that is, beyond 900 F.—otherwise they are liable to expand permanently and cause trouble. It is only necessary to coat the dies about every fifth pouring, the idea being to get a thin layer of the refractory material evenly spread over the face of the dies. Between this and a hot mold and fairly soft iron no undue chilling effect results in the casting beyond the very desirable closing up of the grain of the metal. In the case in point, the making of brake shoes, every fifth cast requires a spraying of the mold.

The system is of course adapted to mechanical elaboration, in order to get the lowest shop cost. Thus by performing many of the small operations automatically, by special devices, or arranging the molds to pass the point

castings being practically smooth and accurate in dimensions, the loss of extra metal through excessive rapping of patterns in sand work is avoided, and no expensive cleaning department is required beyond some little grinding of thin fins. The life of the molds is long, as may be seen in ingot molds for brass and iron bedsteads. The foundry plant is very small for a heavy tonnage, and the process is adaptable for continuous melting and operating.

Interchangeability of the dies in the shell makes it easy to keep the molds up to standard, and these dies being of cast iron are inexpensive. The installation of an expensive power plant is eliminated, the only power required being electricity sufficient to run the cupola blower.

The Brazing of Iron Castings.

The brazing of iron castings, as an industry, has evidently come to stay. The Ferrofix process, discovered by Friedrich Pich, a German scientist, and patented in

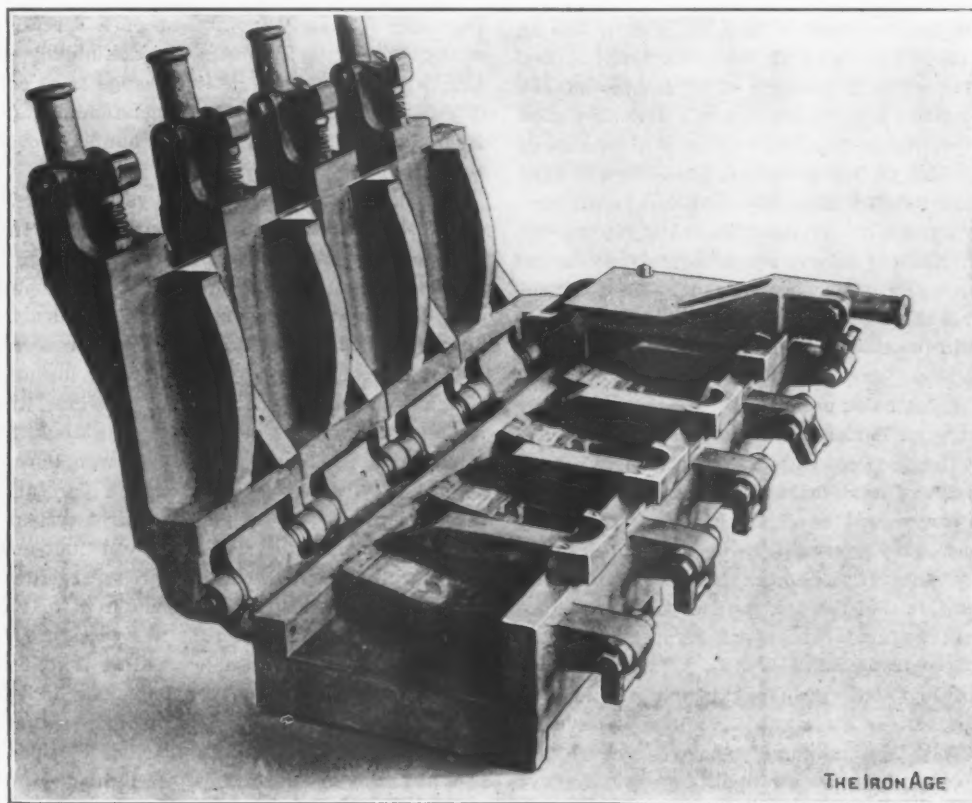


Fig. 2.—Iron Molds for M. C. B. Brake Shoes.—One Mold Closed.

of pouring, much labor can be saved. The work that can be made by sandless molds is naturally of a standard kind, where large quantities of the same piece are required. Hence its introduction for the brake shoe, iron bedstead and other work. Moreover, for the car wheel, the usual cold chill, with a suitable adaptation of a center core, makes a very easily handled wheel.

The sandless mold is best adapted only to work of fairly good bulk, though practically everything can be made in this way, with proper care of the niceties of construction and manipulation. The heating up of the mold consumes some time, and uses metal which must be returned to the cupola, though this can be avoided by heating in the oven. Molds are naturally expensive at first, and hence advisable only when a large number of castings are to be made of a kind. The red hot castings, if small, where machining is to be done, or special requirements are demanded, must be practically annealed either in pile or by an oven. The silicon of the metal also must be a little higher than for sand castings.

The advantages are the following: A limited number of molds will make a great quantity of casting with very little labor, and this is not high class. The surface of the

Germany, the United States and other countries, has been tried out thoroughly in the works of the American Ferrofix Brazing Company, in Philadelphia, Pittsburgh and New York, during the past two years, with, so far as can be learned, marked success. The claim is made that broken and cracked castings can be restored to full strength by this process, at a cost much less than the price of new castings, and the process is so simple and the work can be done so quickly that the additional saving, through economy in time, is often in itself much greater than the price of a new casting.

The plants operated by this company, however, can handle only a small portion of the restoration work which the entire country requires, whereas it would seem that whatever advantages Ferrofix provides should be available to every user of machinery of any kind. The management of the company has realized this and now announces the purpose of selling Ferrofix compound and telling others how to use it in the manner to get the results which are obtained in the company's own shops. By this means the owner of an industrial plant can restore his broken and cracked castings in his own shop and get all the advantages which there may be in the process.

THE IRON AGE

1855-1907.

New York, Thursday, May 30, 1907.

Entered at the New York Post Office, as Second Class Mail Matter.

DAVID WILLIAMS COMPANY,	PUBLISHER
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Certificates of Merit Versus Union Cards.

The suggestion made at the recent meeting of the National Machine Tool Builders' Association that diplomas be presented to those completing a satisfactory apprenticeship is one well worth considering by employers in all branches of manufacture. The Committee on Apprenticeship has the matter in hand, and is taking active steps toward carrying through the details. The purpose is that every apprentice of a member of the National Association shall be entitled to a diploma signed by the officers of the association, as well as the heads of the works in which he has served his time. It will have the usual characteristics of a school or college diploma so far as typographical features go. Its significance should be material, not only in a sentimental way to the boy who is becoming a journeyman, but to his practical good in after life, if occasion arises when he shall go seeking work in places other than where he has had his training.

It is known that union organizations are not over particular as to the mechanical ability of the men to whom they hold out the privilege of working in a closed shop, and the adoption of a uniform diploma by manufacturers would go far toward establishing a class of skilled workmen who would be desirable as employees. Employers could supplement the diploma idea with forms of certificates showing that the holders had passed satisfactory periods in certain branches of manufacture, and armed with these testimonials of good conduct and acquired mechanical knowledge a workman would have a better argument as to his worth than any union card could offer. Then, too, manufacturers would have the benefit of choosing from among applicants for employment men holding diplomas and certificates from shops in which the standard of workmen was known to be high.

The certificate idea is in operation, to a certain extent, among some manufacturers' organizations, especially the National Metal Trades Association, the members of which issue papers to workmen who have given satisfactory service after a short period of work, but we do not know of any organizations that make a practice of giving workmen testimonials from time to time by which they can show the period they have worked at a trade and prove the length of service they have given to various branches of an industry. A workman who may acquire dilatory or vicious habits can with the forms of testimonials now in use put a fictitious value on his services. This could not be possible if certificates were renewed during his service in the trade.

It is to be hoped that the machine tool manufacturers will give the diploma idea a trial, as it is possible that from it can be developed a system of rating employees that will overshadow the value to workmen of a union card. It would seem that any intelligent workman might realize that a testimonial of value received, given by an employer, would naturally put a higher premium on his

services than an organization membership card, and manufacturers by giving preference to men so accredited by former employers could create classes of skilled labor for which conscientious workmen would strive to fit themselves. It would be necessary for employers in working out a plan of this kind to be fair in their dealings with the men, and it might be suggested that the certificates be given, say, annually, in order to prevent their being withheld by an employer because of a disagreement after the employee had worked for a long period.

The Relations of Machine Shop and Foundry.

The responsibilities of foundrymen in their relations with machine tool builders, a subject raised at the recent convention of the National Machine Tool Builders' Association, involves some interesting questions. The subject is not new. There has always been more or less friction between the machine shop and foundry, especially when the shop is dependent for its castings upon an outside foundry. But the appointment of a special committee of the machine tool builders to make a study of the question, with a view to a radical change from existing conditions, may lead to a better understanding, and one that from the standpoint of the tool builder would be more equitable.

Machine tool builders who have no foundries of their own insist that the foundry should assume the responsibility of inspection of castings and should work to specifications prepared in accordance with accepted molding practice. In brief, the reply of foundrymen is that conditions in their business are not such as to permit of the same exact system of doing business as characterizes machine tool building. However, the foundry trade would welcome any change that would increase its profits, and machine tool builders who have given the subject close study maintain that a careful system of inspection, as a part of better general system in all departments of manufacture, should work out into financial betterment. The drawbacks of present relations between the trades have emphasized themselves in the machine shops in the rush of the past two years, for failures of foundries to deliver usable castings have resulted in many a delay beyond agreed dates for delivery of machinery to customers. A core out of place or forgotten, a distortion in the mold, a fracture in tumbling or in handling; any one of various possibilities may bring with it serious consequences to a machine building business.

The solution of the difficulty, according to influential machine tool builders, would be the adoption by the trade of a uniform contract calling for castings manufactured according to blue prints within limits admissible in molding; also for inspection before delivery, to insure castings free of imperfections, according to accepted standards of excellence. Naturally, some imperfections are revealed only by machining, but too great a percentage of such hidden flaws would also call for a remedy. What is wanted is to procure for the machine shop castings that may be depended upon to answer requirements, without the precaution of a laborious and costly system of shop inspection.

To the foundryman's suggestion that such a system would involve additional expense and would mean higher prices the machine tool builder answers that he would gladly pay the difference. He could afford to, he argues, because he would be rid of the cost of inspection, and also to a great extent of annoying delays consequent upon the discovery of fault in castings needed for immediate use. To replace the parts means disappointment to the customer, especially where heavy castings are in-

volved, requiring time in their making. Foundrymen are positive in the claim that a change, as suggested, is entirely impracticable. In many jobbing foundries there are few men who can intelligently read a blue print. Custom has not compelled a knowledge of drafting, even the superficial knowledge required for the correct reading of a drawing of an ordinarily complicated casting, showing location of cores, &c. The pattern maker should do his work so that no blue print would be necessary, according to the average foundry foreman. The machine shop should see to it that difficult molding be supervised by its own expert. Inspection has always been the duty of the shop and not of the foundry. The class of labor is another element in the discussion. But the whole matter simmers down to a long established custom upon which are based the present schedules of prices. Altogether it is evident that the foundry trade will have to be influenced in some very radical manner in order to change its relations with its customers of the machine tool business. A standard form of contract, adopted generally by machine tool builders having no foundries of their own, might accomplish this end, but we are inclined to believe the change is more likely to come as a natural business evolution, which can be assisted by open discussion of the questions involved.

It must not be understood that all foundries are operated without carefully worked out methods of management, based upon the most modern ideas. There are many finely organized foundries, especially among those that constitute departments of machine building establishments. The shop system is extended to the foundry. Some of the jobbing foundries are equally well equipped. On the other hand there are many foundries, not a few of them quite successful, that are operated under the business methods of a generation and more ago. In these systems of cost, of inspection, of storage of patterns, of records, such as blue prints and specifications, are yet to be introduced. Under such conditions it is natural that the foundryman should place as much responsibility as possible upon his customers. He is prepared to make good for defective castings, and he puts his skill and that of his employees against the possibilities of poor work. There is something of trusting to fortune in the general way of doing things.

Considering the question as one of dollars and cents, it would seem as if the machine tool builders in their crusade for a change of basis are working toward a system that would earn larger profits for the foundries. The establishment of a first-rate system should pay. The expressed willingness of customers to pay higher prices has not been tested, to be sure, but perhaps the difference would not be so great after all. It is always expensive in any business to depend upon the customer to discover imperfect goods. Faults detected before shipment mean cartage or freight saved. Relations with customers would be more congenial and perhaps more permanent. There are two sides to the controversy and doubtless both are based upon what seem sound reasons. So radical a change in long established custom cannot come about at a single stroke. But agitation should result in better understanding and eventually in a basis advantageous to both the important trades involved.

The German Treaty Opposed by Manufacturers.

Customs, importing and domestic manufacturing circles are evincing deep interest in the probable effect to follow the introduction of the modifications in tariff administrative features which have been granted to Ger-

many. Undoubtedly one of the most important concessions, if not the chief, is that made by our Government regarding the acceptance as a basis for ad valorem duties of the "export" value of merchandise under certain conditions, instead of the "actual market value or wholesale price thereof at the time of exportation to the United States in the principal markets of the country from which the same has been imported," as provided in section 4 of the customs administrative act of 1890. In behalf of the German exporters and their connections in this country the argument was made at the sessions of the International Tariff Commission, held in Berlin last winter, that many lines of German goods are manufactured almost exclusively for shipment to the United States and that consequently no "foreign market" for the merchandise exists in the sense contemplated by the American administrative law.

Under these circumstances the German exporters have been able to convince President Roosevelt and Secretary Root that the lower "export" prices shall be allowed to prevail. While this concession is hailed with the keenest satisfaction by the exporters and foreign manufacturers, not only in Germany, but in other countries also, as the new rule will apply to all export goods regardless of country of origin, indications are not wanting that after the full purport of the concession is realized by American interests numerous protests will be directed against this feature of the compact. As a forerunner of domestic opposition to the acceptance of export values, as distinguished from the foreign market price basis, the action taken May 22 by the National Association of Manufacturers is significant. This action is reported in another part of this issue. It will be seen that the sentiment of the association is adverse to the approval of the treaty by our Government. It is said on excellent authority that other influential manufacturing organizations will follow the example of the National Association of Manufacturers. The American Protective Tariff League, while being on record as opposed to the entire German agreement, is understood to be planning a lively campaign against the "export value" feature of the agreement.

CORRESPONDENCE.

The Soft Metal Cap for Projectiles.

To the Editor: Noting the paragraph on page 1550 of *The Iron Age* of May 23, in regard to "The Function of the Soft Metal Cap for Projectiles," and the explanations therein, I respectfully offer the following explanation, which may or may not be new in this connection: The soft metal cap acts as a jig or guide to keep the point of the projectile straight into its work, instead of allowing it to be deflected. Does this not appear reasonable?

NIEL GRAY, JR.

OSWEGO MACHINE WORKS, OSWEGO, N. Y., May 27, 1907.

A Question of Business Ethics.

To the Editor: We recently have had two not unusual but suggestive experiences. A very heavy consumer asked for a quotation on coke, naming specific quantities to be delivered over a period of a year. Certain guarantees, &c., were asked, and we went to considerable expense and trouble to make a price on what was wanted. To secure the information, half a dozen long-distance telephone calls were necessary, in addition to a special trip of a traveling salesman. Finally it turned out that the consumer himself was largely interested in a coke company and simply wanted the information so as to check the sales which this concern had been making. If he had been perfectly frank at the start there would have been no trouble about furnishing the information, but

it could have been done without the stress, energy and promptness and expense.

Another customer inquired for iron of a very unusual analysis. He wanted it immediately, if not sooner. Again long-distance telephone calls were necessary, and the special trip of a salesman. It turned out that a foreman in the concern had suggested that to remedy some troubles in the foundry this iron might possibly answer. So an inquiry was sent out for it. Later on the manager of the company stated that the foreman's ideas were visionary and that it would be a foolish waste of money to invest in such iron as he wanted.

Sellers of iron and coke are constantly being put to great expense in just this way. Possibly if consumers would be a little more frank in their inquiries when they do not mean business, or when they want information and nothing more, it would be better. But to get information under the guise of an inquiry for the purchase of material is plainly a violation of ordinary business ethics.

MAY 24, 1907.

A.

John A. Walker.

John A. Walker, vice-president and treasurer of the Joseph Dixon Crucible Company, Jersey City, N. J., died



JOHN A. WALKER.

May 23. He was born in the city of New York, September 22, 1837. He received his early education in the schools of Brooklyn, and, although prepared for college in a private school, chose commercial life. After an excellent business training in the city of New York, and after serving his country in the Civil War, Mr. Walker in 1867 became connected with the firm of Joseph Dixon & Co., Jersey City. In 1868, when that firm became incorporated as the Joseph Dixon Crucible Company, he was made secretary of the company and began his life-work in making known to the world the many uses of the then but little known form of carbon—graphite—of which the Joseph Dixon Crucible Company has been the best and most widely known exponent. He served the company as secretary and largely as manager until 1891, when he was unanimously elected to the dual position of vice-president and treasurer, the latter office having been held by him for some time previous. He held these offices without interruption until his death, the general management of the company also being largely in his hands.

In stature Mr. Walker was somewhat below the average, but, born of sturdy Scotch parents, he was a good type of the nervous, driving, untiring, persistent Scotchman. In intellect he was keen, clear, critical, intuitive. In business he was thoughtful, cautious in looking ahead and preparing for emergencies. His moral brain made him a just man. He was of the staunch Presbyterian school. What he believed to be right he did—no matter what others might do or say. Yet he was not contrary, nor set in his ways, nor unreasonable. While his sym-

pathies were keen and easily aroused and his hand ready to open, yet no one found him wasting anything. Nothing escaped his eye. He had decided literary tastes and could put them to the test any day, either for business purposes or for an ethical cause. Untiring and persistent devotion to business, however, with increasing age and lack of needed rest and recreation, began to tell on his vigor and strength, and on April 24 he went home for what he and his intimates supposed would be a few days' rest. Complications set in and a month later he was at rest forever.

As vice-president and treasurer of the Joseph Dixon Crucible Company there was more than work enough for any ordinary man, yet, outside of his duties as such, we find him vice-president Colonial Life Insurance Company, director New Jersey Title Guarantee & Trust Company, director Pavonia Trust Company, director Provident Institution for Savings, president Children's Friend Society, all of Jersey City; trustee Stationers' Board of Trade of New York. He had served as first vice-president of the National Stationers' & Manufacturers' Association. He was a member of the Chamber of Commerce of New York and of the Board of Trade of Jersey City. He was chairman of the Executive Committee of the Cosmos Club of Jersey City, member of the Carteret Club, the Union League Club, the Lincoln Association, all of Jersey City; member of the National Geographic Society, and associate member of the American Institute of Mining Engineers and of the Society for Psychical Research. In the years gone by Mr. Walker has actively and successfully served as member of the Jersey City Board of Education, as trustee of the Jersey City Public Library and of other city institutions.

Whether as public official or officer of any institution, or member of any club, Mr. Walker has always been prominent and active and ready to take upon himself any duty or work and has always been successful in any thing that he has undertaken. Better than all, he won the affection of thousands, and notices of his death brought messages of sympathy from business friends and others from all parts of the United States, and from many foreign cities. He leaves a widow only.

The action of the last Legislature in raising the franchise tax for companies incorporated in Maine to almost double the former assessment will probably cause a large falling off in the number of foreign incorporations, and thereby lose to Maine much of the income derived from both the incorporation and franchise taxes. For the last few years the State has received considerable aid in paying current expenses from the big taxes paid by foreign corporations, which have taken advantage of Maine's liberal incorporation and franchise laws, to organize there. The last Legislature, however, almost doubled the franchise assessment, raising the tax from \$275 to \$525, although the rate of \$1 for each \$10,000 of capital still stands as the assessment for incorporations.

Press dispatches from Chicago state that between 50,000 and 100,000 men will be thrown out of employment by the railroads before the end of the first week in June. Orders were issued some time ago by the various roads that by June 1 the forces in all departments must be reduced to a minimum. It is customary for the railroads to reduce their pay rolls at the beginning of summer, when traffic is the lightest and to increase them again as the winter months arrive. This year the roads have issued especially stringent economy orders. It is stated that the working forces will be reduced to the lowest possible point.

Jones & Laughlin Steel Company, which originally intended to build only two blast furnaces at its new works at Aliquippa, Pa., has decided to build a third stack, which will be 22 x 85 ft., the same size as the two now under way. The Ritter-Conley Mfg. Company, which received the contract last December for building two furnaces, has also received the contract for building the third stack. It will be equipped with four Kennedy-Cowper stoves, each 22 x 100 ft.

Vanadium.

Vanadium is an almost unique, and certainly by far the most prominent, example in the history of metallurgy of an element which has suddenly bounded from the position of a museum curiosity to extended practical application in the heavy arts. As the results of tests upon vanadium steel, Professors McKenna of Yale, McCaffrey of Columbia, Bliss of New York and Arnold of Sheffield (England) universities have spoken with no uncertain voice as to the extraordinary value of the element to the steel trade, and partly as a result of these opinions and partly as the outcome of their own practical researches steel manufacturers in this country are now engaged in the production of many different grades of vanadium steel in all shapes, from large armor plates to delicate automobile parts. These manufacturers comprise the Carnegie Steel Company, Colonial Steel Company, Firth-Sterling Steel Company, all of Pittsburgh; the United Steel Company, Canton, Ohio; the Bethlehem Steel Company, South Bethlehem, Pa., and many others.

Source of Supply of Vanadium.

Up to a comparatively recent date the amount of vanadium available was restricted, but the American Vanadium Company of Pittsburgh, whose president is James J. Flannery, has lately developed an enormous source of supply of the element, the magnitude of which bids fair to revolutionize the steel trade.

In the latter part of 1905 this company sent a young Pittsburgh mining engineer, Foster Hewett, to look into matters in connection with some reported finds of vanadium ore in Peru. This ore proved disappointing on close investigation, but to Hewett's keen sightedness it appeared a finger post pointing to better things. After many weeks of arduous work in the mountains his hardships and labors were rewarded by the discovery in the Cerro de Pasco Province of huge bodies of rich vanadium ore of a grade which had never been suspected to exist by either the mineralogist or metallurgist. The ore is a rich sulphide, and is easily mined in lumps somewhat resembling a dull coal. It contains about 40 per cent. of vanadic acid equivalent (or a net content of over 22 per cent. of metallic vanadium), the remainder consisting almost entirely of free sulphur and some silicious matter. Enough ore is in sight to supply the steel trade for many years, while the quantity in sight is small as compared with the quantity which is known to exist on the property. It is owned by the American Vanadium Company, which has bought the land outright from the previous owner, a wealthy Peruvian.

These mines are now developed to such an extent as to be prepared to take out 100 tons of ore per day, if necessary. Some 10 tons per day are actually being mined at this time, and a reserve of several hundred tons of this ore has been accumulated in the warehouses at Pittsburgh, so that additional quantities of the metal over and above that now being turned out by the company may be accessible the moment its more general use demands this.

The chief metallurgist of the American Vanadium Company, J. Kent Smith, in addition to being a highly trained chemist, with a thorough, practical knowledge of the steel making alloys, is himself a special steel maker of long experience, and it is in co-operation with him that the various steel manufacturers above named are carrying out their work. From the ore is smelted a fusible ferrovanadium alloy; 2-10 of 1 per cent., or about 4 lb. to a ton of steel, is all that is required to make a product (equally easily obtained either from the open hearth or the crucible) which, it is claimed, is superior to any known steel. Regarding the properties of vanadium steel, Mr. Smith says:

Properties of Vanadium Steel.

"The virtue of the addition of vanadium to steel lies in the imparting not only of a very high elastic strength to the material without impairing its ductility, but most of all in its unique property of conferring upon steel ex-

traordinary resistance to deterioration under work, a point demonstrated both by elaborate laboratory tests and by long trial in difficult service. The vanadium steels, in fact, are well named antifatigue steels.

"The old custom of judging a steel by its resistance to static load and the amount which it would stretch under such load gave us a certain general guide as to the behavior of metal under conditions of engineering practice, which are now being left behind rapidly. Even under these conditions occasionally mysterious failures developed, which it is now evident had their origin in the inability of the metal in question to resist strains applied in a totally different manner from those under which it was tested.

"As conditions of modern engineering construction became more and more drastic in requirements in respect to the power of resisting rapidly repeated strains and shocks, accompanied, of course, by increased requirements as to actual strength, the old test conditions were still further receded from in practice, and it became necessary to resort to alloy steels.

"Here was scored much success, but the true needs were nevertheless lost sight of, and metal was still judged almost entirely by its behavior under static loads. With the same ductility an increase in the strength was looked upon as the desirable thing, although it is now recognized that this improvement in strength, if attained at the expense of dynamic properties in the original steel, is of but little use to the engineer in almost all cases. In fine, the steel makers lost themselves in straining after what they did not want, which they only attained at the expense of something they did want.

Vanadium Steel in Machine Construction.

"In modern machine construction, especially in those parts which are liable to failure in use, it is after all dynamic superiority that is the consideration—namely, resistance to repeated stresses, to alternating stresses, or to alternating impacts and to fatigue (which last is the outward and visible sign of intermolecular vibratory deterioration). Thus a new field is opened out, and in this field vanadium has been found by extended experiment and prolonged practical experience to be pre-eminent, in fact, to stand alone. It statically intensifies vastly the strengthening power of another ingredient, thus enabling so little of that ingredient to be used as not to poison the metal dynamically. In itself it confers greatly added dynamic properties to steel. By retarding segregation it renders steel particularly susceptible to the huge improvements due to tempering. Utilizing this same characteristic, steels can be prepared by natural means, which are very resistant to wear and erosion. It toughens steel. It confers great powers of resistance to torsional rupture. In short, it endows it with the quality of "life" in practical work.

"By judicious use combinations are possible which are unattainable by any other means, while also the particular requirements to be met can be encountered successfully, whether they be chiefly (1) static, (2) dynamic or (3), say, equally divided. These very varying aspects must all be considered in order to meet modern conditions, and vanadium represents the only weapon known to us by means of which they can be successfully attacked.

"The metallurgy of large and small articles of offense and defense receives a great impetus from the metal's intelligent use. Railroad equipments of all kinds can be completely revolutionized. The quality of steel suited to automobile use, tool steel, machinery steel of every description, bridge steel, cutlery steel, each in its own direction, is so enormously improved as to enter practically upon a new phase as the result of the application of vanadium. To such an extent are the improvements effected as almost to make the recounting of them sound like fairy stories, did not such rest on the secure foundation of unimpeachable demonstrated facts. In fact, it will not be too much to say that this rendering of an element (till recently spoken of as rare) available in unlimited commercial quantities marks a new epoch in the history of the steel trade."

The German Syndicate Allotments.

There has been published in the *Koelnische Zeitung* the detailed allotments to the different companies in the German Steel Syndicate, which we reproduce herewith. The total is 11,871,617 tons. This, however, will be considerably increased, since additions, to take effect later on, have been conceded to Duedelingen, to Ruemelinger u. St. Ingherter Hochoefen, to Maximilianshuette, to Georgs Marien B. u. H. V., to Westfallsche Stahlwerke and to the Upper Silesian group. In time the total allotment will be considerably in excess of 12,000,000 tons.

The renewal of the syndicate will probably give an impetus to the formation of associations in the line of B products and will make even more serious the position of the rolling mills which must depend upon the Steel Syndicate for their supplies of raw material.

The International Nickel Company.—President A. Monell of the International Nickel Company, in his report to stockholders for the fiscal year ended March 31, shows that the company had a profitable year. According to the figures the total income amounted to \$2,853,650, an increase over the previous year of \$748,910. The surplus,

The Allotments of the German Steel Syndicate.

Names of companies.	A products.				B products.						Grand total. Tons.
	Billets, blooms, &c. Tons.	Track material. Tons.	Beams and shapes. Tons.	Total A products. Tons.	Bars. Tons.	Wire rods. Tons.	Plates and sheets. Tons.	Steel castings and forgings. Tons.	Total B products.* Tons.		
Gelsenkirchener B.-A.-G.	74,775	74,297	134,532	283,604	162,000	60,000	.....	3,000	225,000	508,604
Eisen- u. Stahlwerk Hoesch .....	.....	84,611	86,379	170,990	205,024	31,046	40,268	7,181	283,519	454,509
Gew. Deutscher Kaiser, Thyssen & Co.	19,325	179,337	156,338	355,000	377,325	20,000	125,000	4,000	619,325	974,325	
Gutehoffnungshütte.	37,500	185,169	66,911	289,580	114,919	42,000	95,500	44,000	296,419	585,999	
Hasper Eisen- u. Stahlwerk	13,000	.....	42,883	55,883	69,085	40,344	.....	.....	118,429	174,312
Phönix	104,396	214,896	111,162	430,454	230,287	180,847	208,182	79,861	609,177	1,129,631	
Rheinische Stahlwerke.	90,925	130,272	52,108	273,305	120,000	.....	71,000	25,000	216,000	489,305
Union	46,080	133,508	92,731	272,319	140,000	.....	.....	24,177	164,177	436,496
Deutsch-Luxemb. Bergw.- und Hütten-A.-G.	92,052	36,411	123,000	251,463	55,000	50,000	.....	.....	105,000	356,463
Luxemb. Bergw.- u. Saarb. Eisenhütt.-A.-G.	3,000	75,635	178,839	257,474	128,201	29,665	.....	.....	157,866	415,340
Röchlingsche Eisen- und Stahlwerke.	10,000	74,696	168,849	253,545	118,936	38,538	.....	4,321	161,795	415,340
Gebrüder Stumm.	23,000	93,950	130,242	247,192	133,148	35,000	.....	.....	168,148	415,340
de Wendel & Co.	12,000	79,000	186,000	277,000	218,000	35,000	90,000	2,000	345,000	622,000	
Rombacher Hüttenwerke	176,505	67,292	104,675	348,472	135,000	45,000	.....	1,000	181,000	529,472
A.-G. d. Dillinger Hüttenwerke	67,760	56,249	.....	124,009	.....	.....	122,060	12,500	134,560	258,569
Eisenh.-A.-V. Düdelingen.	128,000	47,000	47,000	222,000	23,000	.....	.....	.....	23,000	245,000
Lothr. Hüttenv. Aumetz-Friede	160,938	52,696	88,790	302,424	80,000	.....	.....	.....	80,000	382,424
Rümelingher u. St. Ingberter Hochofen. ....	.....	35,688	18,179	53,867	50,115	28,148	.....	541	78,804	132,671
Eisenw.-Ges. Maximilianshütte	5,000	68,098	64,096	137,194	62,152	.....	15,000	.....	77,152	214,346
A.-G. Pelter Walzwerk. ....	.....	6,776	201,510	208,286	132,390	.....	.....	258	132,648	340,934
Bochumer Verein.	75,651	125,852	4,000	205,503	27,562	.....	.....	102,892	130,454	335,957
Gesellsch. f. Stahl-Industrie .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Georgs-Marion-Bergw.- u. Hüttenverein.	500	90,000	.....	90,500	32,500	.....	.....	22,000	54,500	145,000
Fried. Krupp Akt.-Ges.	200,945	251,995	73,887	526,827	219,060	8,218	51,817	169,959	450,090	976,917	
Stahlwerke van der Zypen	7,403	5,990	25,953	39,355	42,893	.....	.....	25,252	68,145	107,500
Sächsische Gusstahlfabrik .....	.....	38,638	.....	38,638	28,094	.....	.....	7,306	35,400	74,038
Westfälische Stahlwerke .....	.....	51,700	17,500	69,200	63,200	.....	.....	27,500	90,800	160,000
Ver. Königs- u. Laura-hütte .....	.....	58,660	30,000	88,660	120,000	2,000	62,000	25,829	234,465	323,125
Oberschles. Eisenbahnbed.-A.-G. ....	.....	63,340	118,000	181,340	217,000	78,000	86,000	33,660	486,660	668,000
Kattowitzer Akt.-Ges. ....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oberschl. Eisenindustrie, Gleiwitz. ....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals.	1,348,755	2,381,765	2,323,564	6,054,084	3,304,991	741,806	960,827	622,237	5,817,533	11,871,617	

* Inclusive of 49,000 tons of billets and blooms for Silesia (1000 tons to Koening u. Laura Huette and 41,000 tons to Oberschlesische E. I. for sale in Silesia and 7000 tons to latter for sale outside of Silesia), and 138,672 tons of tubes (84,000 tons to Thyssen & Co., 1036 tons to Krupp, 23,636 tons to V. Koening u. Laura H. and 30,000 tons to Kattowitz A. G.)

The striking fact is the decline in the allotments of billets, blooms and other semifinished steel, which was 2,019,085 tons on January 1, 1907, and is now cut down to 1,348,755 tons, a decline of 670,330 tons, due largely to the merger of Rothe Erde with Gelsenkirchen and of Phoenix with Hoerde. The total allotments of a product of 6,054,084 tons compare with 6,227,362 tons on January 1, there having been an increase in railroad track material and in shapes to partially offset the falling off in billets. The allotment in B products has risen from 4,851,722 tons on January 1 to 5,817,533 tons on May 1.

Krupp, with the new works at Rheinhausen, has the largest allotment of billets, the most important other group being the Lorraine works of Rombach, Duedelingen and Aumetz-Friede. Krupp again is the largest maker of steel rails and track material, followed by Phoenix, Gutehoffnungshuette, Thyssen and Bochum. Peine ranks first in shapes, with de Wendel next and Differdingen third. The two works of the Saar District, Roehling and Stumm, are among the large producers. In steel bars Thyssen is the leader, with Phoenix, Krupp, de Wendel and Hoersch in the 200,000-ton class. Phoenix is far and above in the lead in wire rods and in plates and sheets.

after preferred dividends, reached \$1,664,557, an increase of \$525,285. The final surplus was \$1,254,769, or a gain of \$500,000. Mr. Monell says, in part: "Our efforts during the past year to introduce nickel into new commercial arts have met with continued success. Our export trade has shown a commendable increase over the records of our last fiscal year, although competition abroad is active and is always to be expected. The business of the company for the past year has been very good, and there is still every promise of increased business for the coming year." W. T. Graham, president of the American Can Company, has been elected a director, filling a vacancy on the board.

A call has been issued for a wage scale conference between the Amalgamated Association and the Western Bar Iron Association, to be held at Detroit, June 4. The Amalgamated Association, as shown elsewhere in this issue, asks advances in nearly all departments. The questions to be discussed at this conference, therefore, have a bearing of vital importance to the manufacturers of iron, and the results will be awaited with a marked degree of interest by all interests concerned.

OBITUARY.

GEORGE R. DUNELL.

The announcement of the death of George Robert Dunell in London, England, on May 12, in his sixtieth year, will be heard with regret by many friends in the United States, who knew him as a talented engineer and writer on engineering subjects. In the early eighties he visited the United States and spent some time at the works of the firm of Herreshoff, to acquire a knowledge of its boiler preparatory to becoming agent for it in Great Britain. He introduced the boiler in many directions. The British Admiralty took it up and Mr. Dunell induced them to purchase some torpedo boats of Herreshoff manufacture. He also made a visit to Russia in order to teach the naval engineers of that country how to work the Herreshoff torpedo boats. About 25 years ago Mr. Dunell's contributions to *London Engineering* began, and in later years he had devoted more and more time to technical journalism.

Mr. Dunell will be especially remembered in the United States as the writer of the series of articles on "American Engineering Competition," which appeared in the *London Times* in 1900 and 1901. In gathering the material for these articles Mr. Dunell traveled extensively in this country and studied the methods of important firms in the iron and steel, machinery and metal working industries. His conclusion was in general that American push and labor saving methods, and the willingness shown everywhere in American industry to discard an old machine or an old way when something better was found to take its place, were rapidly distancing British manufacturers. Some of the strictures upon British backwardness and inertia were so severe as to provoke some sharp rejoinders from representatives of the British engineering trades. Mr. Dunell's name was not attached to the *Times* articles nor to the books reprinting them which appeared in Great Britain and the United States in 1902. For many years Mr. Dunell was assistant secretary of the Institution of Naval Architects in Great Britain, and had an important part in the preparation of its Proceedings. His last visit to the United States was in connection with the New York meeting of the Iron and Steel Institute in October, 1904.

EUGENE B. WILLARD, JR.

Eugene B. Willard, Jr., who lost his life May 21 by the explosion at the No. 1 Eliza Furnace of the Jones & Laughlin Steel Company, Pittsburgh, comes of iron-making parentage. His great grandfather, Uri Seeley, made iron from bog ores at Arcole Furnace in Lake County, Ohio, in 1823, nearly the entire product of the furnace being made into hollow ware. His grandfather, James O. Willard, left New Hampshire in 1834, and secured employment at Geauga Furnace, near Painesville, Lake County, Ohio, removing to the Hanging Rock iron region in 1838, and in a few years becoming principal owner of Buckhorn Furnace, and was one of the prominent iron masters of that region. His father, Eugene B. Willard, Sr., in 1866 entered the employment of Means, Kyle & Co., the proprietors of Pine Grove and Ohio charcoal furnaces, and later Hamilton Coke Furnace, continuing the connection until 1902.

Eugene B. Willard, Jr., was born at Hanging Rock in 1874. After graduating in 1894 with honor at the Pennsylvania Military College as civil engineer, he was employed at Hamilton Furnace, Hanging Rock, Ohio, three years. Following this was a two years' course in chemistry and metallurgy at the Case School of Applied Science, Cleveland, Ohio, after which he returned to Hamilton Furnace and managed it with marked ability and success for 18 months. He then went to Chicago and was employed about two years while the No. 2 Iroquois Furnace was being built and put in operation. He then took charge of the three stacks of the Wellston Iron & Steel Company at Wellston, Ohio, and managed them with great success and credit for four years. In July, 1906, he took the position of assistant to the general superintendent of the Eliza Furnaces, where he made a

brilliant record as a furnaceman and achieved an enviable reputation as a man. His untimely death closes a career of promise and usefulness.

JOHN SHOOK, a prominent business man of Warren, Ohio, and general manager of the Warren Hardware Company and of the Warren Steel Range Company, died May 15.

JOSEPH H. BERRY, head of the firm of Berry Brothers, varnish manufacturers, died at Detroit, May 22, aged 68 years. Mr. Berry's interests were very extensive. He was connected with no fewer than 49 firms and corporations. While his name was prominently identified with varnish manufacture, this was not as large as some of his other interests. He had lumber holdings in Michigan, Wisconsin and the South, and was identified with the manufacture of charcoal and charcoal by-products, particularly wood alcohol, these industries being scattered over the country. For years he had been engaged in the manufacture of charcoal pig iron and only a few weeks previous to his death he was made president of a company which gathered together a number of charcoal iron furnaces in Michigan and Wisconsin, under the name of the Lake Superior Iron & Chemical Company. He was director in two Detroit banks and connected with other financial institutions. Mr. Berry's wife died some years ago. He is survived by three daughters.

ROBERT FORSYTHE, who was born at Braintree, Mass., September 5, 1869, died recently at Cambridge, Mass., of typhoid fever, complicated by diphtheria. He was graduated at Harvard University in 1894, and subsequently took his master's degree. For some years he taught metallurgy at Harvard, and then entered the service of the Pennsylvania Steel Company, at Steelton, Pa., and of the Tidewater Steel Company, at Chester, Pa. More recently he was connected with Plint & Co. of Philadelphia. At the time of his death Mr. Forsythe was completing the revision of the proofs of a book on the blast furnace, on which he had been busily engaged during the past few years.

Labor Conditions in San Francisco.

Reports from a private source in San Francisco, says the *New York Sun*, indicate that the Western city is not allowing the true state of the chaos existing there through the present acute labor troubles to be published, either at home or abroad. It has come to be a hand to hand struggle in San Francisco between the organized unions and the unorganized mass of the citizens, of which the bloodshed in the street car strike and the attack upon the Japanese are only two manifestations. The labor unions are fighting to hold the grip they have maintained on the city for the past 15 years against the protest of the rest of the people first called forth by the collapse of the corrupt municipal government. It is the final stand of union labor. Either it will win and play a further part in the politics and industrial relations of the city, or it will be stamped out altogether and San Francisco will be "open shop" for the first time in half a decade.

The United Railroads will probably win out in the present strike, but there is grave danger of a general labor war against all employers and the tying up of the town. Besides the street car operatives there is a general strike all down the line against the proprietors of foundries and machine shops. For two months not a steam laundry in Oakland or San Francisco has turned a wheel because the laundry workers' union is out on strike. One-half of the big breweries about the bay have closed rather than give in to the demand of the brewery workers' union. A strike is threatened by the waterfront federation, including the freight handlers and teamsters.

It seems to be in the air that in the event of a big strike in the industries all down the line the policy of the employers shall be simply to shut down and not attempt to run their factories; in other words, to bring on a period of depression in order to force the unions to reason. This is deplorable, yet the employers say that they have been driven to the last ditch by the demands of the unions.

Electric Smelting in Canada.

Dr. Haanel's Report of the Sault Ste. Marie Experiments.

TORONTO, May 25, 1907.—The experiments in the electro-thermic smelting of Canadian iron ore, which were carried on under Dominion Government auspices at Sault Ste. Marie early in 1906, excited much interest at the time, and a full statement of the results and conclusions has been awaited with considerable curiosity. Such a statement has now appeared in the very full report presented by Dr. Haanel, Superintendent of Mines, who directed and watched over the operations. The report has been prepared with great care and leaves the impression that no detail has been omitted. Dr. Haanel seems to have all the scruples of the physicist in search of new knowledge. Apparently nothing that could have any possible influence in the determination of results was deemed too unimportant to be noted. This fullness gives great value to the volume. A conscientious record of painstaking experiments is particularly to be desired in pioneer work of so great moment as the bringing of Canada's lean magnetite iron ores, whose sulphur content negatives their economic treatment in the blast furnace. A fair idea of the ground covered by the report is given in the letter of transmission at the beginning of the volume. In this Dr. Haanel tells the Minister of the Interior that:

The report contains a detailed statement of the work done and results obtained, of all measurements made, of the analyses of the pig and slags produced, and of the ores employed. To facilitate the comprehension of the text illustrations are given of the furnace employed and changes made in its construction, and of the machinery employed. Plans are given of two commercial electric furnaces which have recently been patented. In an appendix a detailed account and description, with illustrations, are given of the recent inventions and improvements made in electric furnaces in Sweden, also an account by Professor Eichhoff, professor of metallurgy of the Technical High School at Charlottenburg, Germany, of the advantages of the Héroult electric process of making high class steel and cost of production.

Experimental Plant Faulty.

In the course of the experiments many instructive observations were made, and both the furnace practice and the very structure of the furnace were modified in accordance with some of them. Into the account given of the 19 runs and their numerous casts it is impossible to enter in the space of a newspaper article. Evidently the small experimental furnace used was very imperfect. Dr. Haanel expresses the opinion that the largest unit that can at present be constructed on the model of this furnace will not exceed 2000 hp., of which capacity is an electro-thermic iron smelting furnace now being erected at Baird, Cal. Several suggestions are made for the adapting of the Sault type of furnace to the ascertained requirements of the process. These suggestions are incorporated in a two-shaft furnace that has recently been patented, an illustration of which is given in the report. The experiments indicated that under normal conditions about 11.5 tons were produced by an expenditure of 1000 electric horsepower days. With a properly constructed plant it is assumed that the output per 1000 horsepower days would certainly reach 12 tons. This figure has been adopted as one of the data in the calculation of the cost of production per ton.

Electric and Blast Furnaces Compared.

The comparative advantages of the electric and the blast furnace are discussed. The tendency of the latter, it is pointed out, is toward increased capacity, 600 to 800 tons per day being an output not uncommon among them. It has been established apparently that furnaces with a height of 90 ft. and corresponding output are the most economical. So long as fuel is cheap and superior ore is abundant there will be an absence of disadvantage in the employment of such large units. It is admittedly desirable, however, to minimize the following conditions, as enumerated in the report:

1. Large cost of furnace.
2. Excessive cost of charging machinery and upkeep of same.
3. Large expense and probable idleness through breakdown.
4. Cost of and difficulties of making repairs, relining, &c.
5. Serious complications resulting from scaffolding, involving loss of life and money.
6. Financial loss resulting from wrong composition of charge, involving many tons of iron before correction can be made.

But the blast furnace, Dr. Haanel proceeds to say, expensive though it is, cannot be far from perfect in its way, being the outcome of a hundred years' experience and inventive skill. If the electric furnace, a thing yet in its infancy, is already able to compete with the blast furnace, what, he asks, may be expected when all the calories available in an electric furnace have been utilized by proper design as the result of years of experience? It is scarcely to the point, he argues, to speak of faults or disadvantages in a new invention, which as they are realized may be corrected, but the material claims of a new apparatus pertain to such advantages as it may present by comparison with a highly developed machine. The following are some points which are counted in favor of the electric furnace:

1. Original small cost of furnace.
2. Absence of bulky or costly charging machinery.
3. Small expense involved through breakdown.
4. Small cost and ease with which repairs may be made.
5. No serious complications arising from scaffolding.
6. Loss due to wrong composition of charge reduced to a minimum.
7. Perfect control of the temperature in the reducing and melting zone.

It must be remembered, he adds, that a smelting plant operated by electricity is composed of several small units, the disablement of any one of which will not render the plant idle. In case of accident, too, such a furnace will cool down in a very short time, permitting the speedy making of repairs. The fact is adduced that blast furnaces producing cyanide of potassium yield a very bad quality of iron. The formation of cyanides, it is explained, is effected by the nitrogen of the blast in presence of a basic slag, and concurrently the nitrogen combines with the ferrite to form nitride of iron, the presence of which in the iron renders it brittle. Since the recent discovery of this fact nitrogen has been reckoned among the enemies of iron. Hence, Dr. Haanel points out, all processes which employ in the production of iron and steel atmospheric combustion as the heating agent may lead to the introduction of nitride of iron in the resulting product and thus injuriously affect the mechanical qualities of the iron and steel. This explains, he adds, why certain iron and steel with low sulphur and phosphorus show great brittleness. The fact that nitrogen is necessarily excluded by the electrical process insures the superiority of the product by comparison with that yielded by blast furnace treatment.

Various Ores Used.

In the experiments the following classes of ores were used:

1. Hematite.
2. Magnetite from the Wilbur mine, Ontario.
3. Magnetite from the Blairton mine, Ontario.
4. Magnetite from the Calabogie Mining Company.
5. Magnetite from the Calabogie Mining Company, Ontario.
6. Magnetite from the Calabogie mine.
7. Roasted pyrrhotite from the Lake Superior Corporation.
8. Titaniferous iron ore from Quebec.

Commercially Feasible.

Under "General Remarks," Dr. Haanel expresses some of his most important conclusions. The very best of pig iron can be made, he says, from Canadian magnetites that are too high in sulphur to be admitted into a blast furnace. It has been proved that ores carrying as much as 1.5 per cent. of sulphur can be converted into the very finest pig iron by electrical treatment. One fundamental condition, therefore—namely, an abundance of low priced ore, can safely be calculated upon, as Canada has vast fields of sulphurous ores. Another fundamental condition is cheap water power. In no part of the world are natural water powers of more general occurrence than in Canada. Dr. Haanel says that there are in Ontario and Quebec many water powers, surrounded by iron fields, where the cost of development would be as low as from \$4.50 to \$6 per electric horsepower year. He goes on as follows:

With such a price for the energy required, the small consumption of electrode, the cheapness of the ore employed and the peculiar excellence of the pig iron produced, electric smelting of iron ores in Canada in properly constructed furnaces, using charcoal or peat-coke made from our peat bogs of enormous extent, may be pronounced commercially feasible. Under the prevailing conditions in Canada it now only remains for the engineer to design a plant on a commercial scale, say of 100 to 150

tons daily output, with all the necessary labor saving appliances.

Just as in the case of the blast furnace, so likewise with the electric furnace, experience gained will result in further economy, and the day may not be far distant when the carbon monoxide, which is of high calorific value, and which at present as a product of the reaction taking place in the electric furnace is allowed to escape without utilization, will be employed for increasing the output by something like one-fourth. When this is accomplished the blast furnace could not compete with the electric furnace, even under conditions where coke might be cheaper than at present quoted in Ontario and Quebec.

Results.

The results of the experiments are summarized as follows:

1. Canadian ores, chiefly magnetites, can be economically smelted as hematites by the electro-thermic process.
2. Ores of high sulphur content can be made into pig iron containing only a few thousandths of 1 per cent. of sulphur.
3. The silicon content can be varied as required for the class of pig iron to be produced.
4. Charcoal which can be cheaply produced from mill refuse or from wood which could not otherwise be utilized, and peat-coke can be substituted for coke without being briquetted with the ore.
5. A ferronickel pig can be produced, practically free from sulphur and of fine quality, from roasted nickeliferous pyrrhotite.
6. Iron ores containing as much as 5 per cent. of titanium can be successfully treated by the electrothermic process. This conclusion is based upon an experiment made with an ore containing 17.82 per cent. of titanic acid, a pig iron of good quality being obtained.

Cost.

Embodied in the report is an estimate, made by Dr. P. Héroult, of the cost of a 10,000-hp. plant, producing 120 tons of pig iron per 24-hr. day. It is as follows:

Furnaces, contacts, overhead work.....	\$24,500
Bins, chutes, elevators.....	14,000
Crushers.....	4,000
Holsts and regulators.....	10,500
Instruments.....	1,400
Cables for conductors.....	8,400
Building.....	10,500
Mixer and casting machines.....	10,000
Traveling crane and tracks.....	5,000
Ladies.....	1,500
Slag trucks.....	3,000
Ore bins.....	3,000
Repair shop.....	5,000
	\$100,800
Charcoal plant.....	50,000
Power plant (assuming cost of developing 1 electric horsepower \$50).....	500,000
	\$650,800
Electrode plant.....	6,000
The present expenditure.....	43,200
Total.....	\$700,000
Amortization, 5 per cent.; depreciation, 5 per cent.; interest, 5 per cent.; total, 15 per cent.....	105,000
On an annual production of 43,200 tons of pig iron this amounts per ton to.....	\$2.43
The cost of producing the pig iron per ton is itemized as follows:	
Ore (55 per cent. metallic iron) at \$1.50 per ton.....	\$2.70
Charcoal (½ ton at \$6 per ton).....	3.00
Capital charges on plant as above.....	2.43
Labor.....	1.00
Limestone.....	.20
Electrode (18 lb. at 2 cents).....	.36
General expenses.....	1.00
Total.....	\$10.69

Canada's First Electric Smelter.

In the appendix to the report information is given about the electric smelting plant now in course of construction at Welland, Ont. Pig iron is to be the sole product at the outset, but, later, high grade steel and steel castings are to be manufactured. The first installation is to consist of one 3000-hp. furnace of the latest type, brought out by Dr. Héroult and his associates. It is expected to produce 35 tons per day when not utilizing the gases produced by the reduction, and 40 tons per day when the gases are used for preheating and reduction. The power is to be furnished by the Ontario Power Company at a voltage of 12,000 volts, and then transformed to the voltage required. The transformers, which are to be furnished by the Packard Company, St. Catharines, will be of the oil and water cooled type, of 750 kw. each, and arranged with taps on the secondary side to allow a range of from 30 to 40 volts on the secondary. The furnace is arranged in such a manner that a three-phase current can be employed. Concerning the undertaking Dr. Héroult adds:

"The first furnace will be used for the purpose of demonstrating that pig iron can be commercially produced by the electrothermic process, even at such an unfavorable site as Welland, where the price of power is high and the nearest ore supply about 150 miles distant. Some of the ore used will be brought from Port Arthur, containing as high as 1½ per cent. sulphur. Other ores of a very refractory nature will also be used, the intention of the promoters being to employ exclusively Canadian ores.

"The first furnace will be followed by a second one of probably larger capacity. A Héroult steel furnace will be put down at the same time, and the entire production of the second furnace will be used for the manufacture of high grade steel castings, which are at present not made in Canada, and also for a limited number of ordinary steel castings.

"The electrodes will be manufactured by the Héroult secret process, a plant with a capacity of 18 electrodes per week being constructed.

"The organization of this demonstrative plant is due to the efforts of R. Turnbull, Canadian representative of the Héroult processes and furnaces, and also to R. H. Wolff, American representative. These gentlemen, along with some friends also interested in the above processes, are investing their own private capital in the enterprise, thus proving that not only are they certain of the results that can be obtained by this new process, but are now leading the way for others by taking the first risk and building the first commercial plant." C. A. C. J.

Nova Scotia Iron Ore.

TORONTO, May 27, 1907.—Much valuable information about the economic mineral of Nova Scotia is given in a catalogue and description of a collection at the Provincial Exhibition, Halifax, the volume being prepared under the direction of the Department of Public Works and Mines by Harry Piers, curator of the Provincial Museum. The collection was brought together in 1903, and has since been added to from time to time. Under the head of iron ores the catalogue has the following introductory sentences:

Ores of iron are known in workable amounts in nearly every county of Nova Scotia. Every variety and quality of ore is met: Magnetite, red hematite, ilmenite, &c. At present mining operations are confined chiefly to the property of the Londonderry Iron & Mining Company, Colchester County, and to the Torbrook District, Annapolis County. The deposits in the districts of Torbrook and Nictaux, Londonderry, and Bridgeville are very large, and in many cases of excellent quality. Deposits are also known at Clementsport, Clifton, Goshen, Newton Mills, Selma, Brookfield, Arisaig, Pugwash, Salmon River, Mira, East Bay, George's River, Barachois (Borsdale), Whycomagh, &c. At present the steel and iron works at Sydney and Sydney mines are supplied with exceptionally cheap ore from Belle Island, Newfoundland, but as the cost of this ore increases the local deposits will be called on.

Concerning the "shell-ore" vein of the Corbett mine at Torbrook, the following account is given:

The presence of iron ore at this place in rocks of supposed Devonian age has long been known. A quantity of ore was taken from a trench along the outcrop and smelted at Nictaux Falls by a London company some 50 or 60 years ago. After being operated for 10 or 15 years the mine and smelter were abandoned. The depth and extent of this bed was recently proved by bore-holes, and about February, 1903, Geo. E. Corbett, S. M. Brookfield, and others, began sinking a shaft, which is said to have started in 6 ft. of good ore, and which at about 40 ft. had widened out to 7 ft. The mine is at present being extensively developed by the Londonderry Iron & Mining Company, which expects to draw therefrom a supply of ore to take the place of that lately obtained from its Leckie or Tarbrook mine, which is now closed. The mine is about 2½ miles from the Torbrook mine.

C. A. C. J.

The second vice-president of the International Association of Machinists recently wrote a letter to President Smith of the Louisville & Nashville Railroad asking an interview regarding the recognition of the union by the railroad company. The question of wages is not involved. It is stated that the interview was refused. At Louisville, Ky., the question of a strike in the Louisville & Nashville shops is under consideration by the union machinists. At New Decatur, Ala., the machinists in the L. & N. shops went out on a strike, May 28, because of the railroad's refusal to recognize the union.

NEWS OF THE WORKS.

Iron and Steel.

J. T. Shipley, Meyersdale, Pa., who purchased at sheriff's sale about a year ago the Meyersdale Sheet Mills, has taken possession of the plant and is offering it for sale or lease.

The Braddock Machine & Mfg. Company, Braddock, Pa., is building a 14-in. merchant mill for the Clairton Works of the Carnegie Steel Company, consisting of three stands of three-high rolls, four stands of two-high rolls and five stands of pinions. It recently shipped to the Duquesne Steel Works of the Carnegie Steel Company one 14-in. Morgan continuous mill, consisting of eight stands of rolls, eight stands of pinions, with the necessary outboard pillow blocks, gears, shafting, &c. The company, which heretofore has confined itself to heavy mill work, will hereafter manufacture a general line of outside mill work and gray iron castings.

General Machinery.

The Phoenix Iron Works, a copartnership at Boulder, N. Y., has been succeeded by the Phoenix Iron Works Company, which has incorporated with a capital stock of \$50,000. The company has a plant in which it does general repair work and manufactures ore cars, buckets and the Phoenix concentrating table. It also handles new and second-hand machinery. It is the intention to install an automobile garage, and the company will be in the market for drill press, radial drill, lathes, &c. M. Fitzgerald is president; E. J. Lesser, vice-president, and C. M. Williams, secretary and treasurer.

Work has been begun on a new combination barn and shops for the Meridian Light & Railway Company, Meridian, Miss. The buildings will be of brick and steel construction, and the shops are to be equipped with all necessary machines for car building and repair work. General Manager A. B. Patterson has personal charge of the work, which it is expected will be completed by September.

The National Iron Works, Spokane, Wash., founder, machinist and boiler maker, has awarded contracts for the construction of a new brick building, which will largely increase its capacity. It is the purpose to install a complete new equipment, which will include boiler shop and foundry machinery and machine tools.

The Canadian Locomotive Company, Limited, Kingston, Ont., is making extensive improvements and extensions to its plant, for which more than \$600,000 has been appropriated. The improvements will among other things include equipment for a new power house. It is expected that within two years, when the work now planned and under way is completed, nearly 3000 men will be employed in the works.

The Solid Steel Tool & Forge Company, Brackenridge, Pa., is increasing the capacity of its forge department by the addition of some new equipment, including a 4500 lb. Morgan drop hammer, some new furnaces, a full complement of trimming presses and other machinery.

The Brown Folding Machine Company, Erie, Pa., is erecting a new plant, 135 ft. square, to cost \$25,000. The machinery has been purchased.

The Brookford Mills, Brookford, N. C., is to replace considerable of its cotton manufacturing equipment with new machinery, and will purchase new water wheels, gate hoists, a large number of spindles, &c.

The Clyde Iron Works, Duluth, Minn., has submitted plans for its new plant, which will consist of eight buildings. The foundry will be 90 x 180 ft.; machine shop, 90 x 140 ft., 2½ stories; warehouse, 70 x 90 ft.; pattern shop, 90 ft. sq., two stories; blacksmith shop, 50 x 200 ft.; tool house, 50 x 80 ft.; log loader manufacturing building, 80 x 160 ft. All the buildings will be of fireproof construction.

The Des Moines Bridge & Iron Works, Des Moines, Iowa, has purchased a site in Pittsburgh upon which it will erect new shops, to be in a better position to take care of Eastern contracts. The company will shortly place orders for the equipment for the new buildings, which it hopes to have in operation in five months.

The Harrold Foundry & Machine Company, New Kensington, Pa., has been operating its plant night and day for the past two weeks. The company finds business very good, with every indication of having more than it can conveniently handle in the near future.

The Oakley & Janson Machine Company has established a plant at 215 First street, Parkersburg, W. Va., for the manufacture of sand belt machinery, &c.

Power Plant Equipment.

Under the name of the Canton Electric Company, the Central Heating & Lighting Company and the Canton Heat, Light & Power Company, Canton, Ohio, have been consolidated, with a capital of \$2,500,000.

The Canton-Hughes Pump Company, Canton, Ohio, has recently constructed large pumps for the Union Salt Company, Cleveland, Ohio; Columbia Chemical Company, Barberton,

Ohio; Mitchell Engineering & Machinery Company, Butte, Mont.; American Car & Foundry Company, Terre Haute, Ind., and has secured contract for a high duty pumping engine for Cassapolis, Mich. The export trade of the company has also been large, shipments having recently been made to New Zealand, Australia, Japan, China, India, Belgium, Sweden, Canada, Mexico and other countries. The erection of a pattern room, 40 x 100 ft., is made necessary by the increase of business.

Foundries.

The Manufacturers' Iron Foundry, Bridgeport, Conn., has been incorporated with capital stock of \$10,000 by Frederick Schrader, Carl C. Back and Frank D. Wilder. The business was established at 785 Union avenue about a year ago. High grade gray iron castings are manufactured.

The new foundry of the Keystone Driller Company, Beaver Falls, Pa., will be 100 x 300 ft., of brick and steel construction. The company will make brass, gray iron and steel castings.

In order to take care of its increasing business the Killing Molding Machine Company, Davenport, Iowa, has increased its capital stock from \$20,000 to \$40,000.

The Prime Steel Company, Milwaukee, Wis., whose steel foundry was recently damaged by fire, has placed orders for the equipment to take the place of that destroyed in the fire, and has placed its plant in operation.

Rumsey & Co., Seneca Falls, N. Y., manufacturers of pumps and engines, are preparing plans for an addition to their foundry, 50 x 96 ft., which will be equipped with a heavy electric traveling crane for handling the large castings. Another cupola will be installed in the addition for making castings for the larger triplex pumps. The present buildings will be given over to the castings of hand power and smaller lines of power driven pumps. A full equipment of power cranes has been contracted for to handle the ladles.

The Ensley Machine & Foundry Company, Ensley, Ala., is rebuilding its plant, which was recently destroyed by fire. The new foundry will be of structural steel, 40 x 80 ft., and will be equipped with a six-ton traveling crane, blower driven by a 7½-hp. motor, cupola, elevator, tumblers, emery wheels, &c. The equipment will be driven by separate motors. All of the machinery has been purchased.

The Eagle Brass Foundry, Seattle, Wash., has been succeeded by the Eagle Brass Foundry Company, recently incorporated with a capital stock of \$10,000. In order to enlarge its capacity the company has taken the plant formerly occupied by the Olympic Foundry Company. Some new equipment is now being installed. James Tracy is president; John Tracy, vice-president; A. G. Howat, treasurer; William Anderson, secretary and manager.

The Phillips & Butteroff Mfg. Company, Nashville, Tenn., has recently added to the equipment of its foundry a Newton cupola of 16 tons per hour capacity, manufactured by the Northern Engineering Works, Detroit, Mich.

The foundry business heretofore conducted in connection with the manufacturing plant of the Hart Grain Weigher Company, Peoria, Ill., has been incorporated as a separate company under the name of the Hart Foundry Company, with a capital stock of \$75,000. Besides continuing to furnish the line of castings used by the Hart Grain Weigher Company, the new organization will be prepared to take on a considerable tonnage of outside business in a line of work ranging from implement parts to automobile cylinders.

The Peerless Machinery & Supply Company, Wichita, Kan., has just completed the erection of a new foundry, 50 x 75 ft., supplied with a traveling crane and other modern equipment.

The Davenport Locomotive Works, Davenport, Iowa, builder of light locomotives, having recently purchased additional land contiguous to its present plant, is contemplating the erection of a new foundry, 106 x 200 ft. The plans for the building have been practically completed, and it is the purpose to proceed with the construction work without delay.

The Curtis & Co. Mfg. Company, engineer and machinist, St. Louis, Mo., is making additions to its steel foundry which, when completed, will practically double its output. The company makes a specialty of soft solid castings for various classes of machine work.

Bridges and Buildings.

Contract has been awarded to the Southwestern Bridge Company, Joplin, Mo., for all the bridges on the Interurban line between Sherman and Dallas, Texas. The work consists of concrete substructures, with steel superstructures of plate girder spans, riveted truss spans, steel trestles and beam bridges. The company has also received contract for two additional pump houses for the Texas Company, Dallas, Texas.

Vollkommer & Co., engineers and contractors, Empire Building, Pittsburgh, have received a contract for a 72 x 54 ft. steel and brick extension to be made to the power plant of the Allegheny Plate Glass Company at Hite, Pa.

Fires.

No. 2 breaker of the Jermyn Coal Company, at Old Forge, near Scranton, Pa., was burned May 22.

It is stated that a large portion of the machinery was de-

stroyed in the fire which recently burned the plant of the Empire Chair Company, at Elizabethton, Tenn. The total loss is placed at \$50,000.

The plant of the Manhattan Brass Company, New York, was badly damaged by fire May 25.

The machinery, supply and hardware house of Fogarty & Atkinson, San Luis Potosi, Mexico, was burned May 26, the loss being about \$200,000.

The plant of E. C. Atkins & Co., Indianapolis, Ind., was damaged \$12,000 by fire May 23.

The power house and barn of the Buffalo & Lake Erie Traction Company, Blasdell, N. Y., were badly damaged by fire May 24.

The plant of the Shelby Iron Company, at Shelby, Ala., was damaged \$20,000 by fire last week.

The machine shop of Wood & Clark, Norfolk, Va., was burned May 19.

Hardware.

The Miami Cycle & Mfg. Company, Middletown, Ohio, is going through a reorganization, under the charge of C. H. Ballew, consulting engineer. All interests other than S. J. Sorg and A. D. Sorg have been absorbed by the former. The capital stock of the company is to be increased from \$50,000 to \$750,000. This company has developed under its new management an entirely new design of motor cycle, and expects to add a drop forge foundry for making all the parts for both motor cycles and bicycles. It also expects to add a welding plant, and will be able to make every part of a bicycle and motor cycle complete in its own factory. The output of the plant for the present season has already doubled that of any previous year, and it is the intention of the present owners to largely increase its capacity. The company will also manufacture tile coating machines, and the increase in the capital stock from \$50,000 to \$750,000 will include about \$200,000 valuation of important tile coating machine patents.

The Myers Pump & Mfg. Company, Ninth and Wyandotte streets, Kansas City, Mo., is considering the advisability of securing a new location for its plant that will afford better manufacturing and shipping facilities. Plans, however, are not matured and no definite decision has yet been reached in the matter.

The Waterbury Crucible Company, Waterbury, Conn., reports that the volume of its business since January 1 has exceeded that of the same months for 1906, and that April was the largest month in the history of the company.

Brainerd Mfg. Company, Despatch, N. Y., manufacturer of special brass, bronze and steel hardware, is building a new factory which will enable it to handle a much larger business. The factory will have electric power and be equipped with all the up to date appliances connected with the production of the goods. A brass foundry will also be added to the main plant of the company.

The Wable Foundry & Machine Works, Davenport, Iowa, maker of the Easy-to-turn and Easy-to-sell line of rotary and lever washers, has by purchase secured a building for factory purposes at 213-215 East Second street. The building is 40 x 140 ft., three stories. Some improvements will be made at once, which will include the installation of a modern electric elevator.

The Standard Wire Mfg. Company, Fort Worth, Texas, newly incorporated with a capital stock of \$25,000, will at once begin the erection of a new plant for the manufacture of wire fencing and wire cloth at Factory Place, on the outskirts of the city. These goods will be made by special machines, which are also manufactured by the company.

The Midgley Mfg. Company, Columbus, Ohio, is erecting a large addition to its plant, which will give over 160,000 ft. more of floor space and more than double the present capacity of the plant. The company makes automobile wheels and rims.

The Blue Mfg. Company, Fostoria, Ohio, has closed a deal for the purchase of the plant and business of the Shunk Plow Company, Fostoria, Ohio. The Blue company proposes to issue about \$90,000 in additional stock and to erect two new buildings. The buildings will be one story in height and about 80 x 225 ft.

Collier & Keyworth, Gardner, Mass., manufacturers of go-carts and baby carriage hardware, are to add a story to their factory, making it a three-story building. The new space will be 40 x 100 ft. The firm states that the necessary machinery has been purchased.

Lebanon Valley Chain Company, Lebanon, Pa., will shortly change its title to Welmer Chain & Iron Company, using a name which is well and favorably known in the furnace trade. E. A. Welmer, who is president of the Welmer Machine Works Company, is president of the new concern; A. A. Welmer is treasurer, and George E. Holly, formerly secretary and treasurer of the Lebanon Chain Works, is general manager.

Union Caliper Company, Fitchburg, Mass., manufacturer of Union spring calipers and dividers and punches, has just moved to 5 Main street, that city, where it has largely increased its capacity.

Miscellaneous.

The Motor & Mfg. Company, Geneva, N. Y., has been reorganized with a capital stock of \$40,000, under the name of the Motor & Mfg. Works Company. At present the company manufactures ejectors, mufflers and cut-out valves, but expects to extend its line of manufacture to other gas engine accessories. D. Reid is president and M. G. Hoskins secretary and treasurer.

The Canada Corundum Company has moved its main office from Toronto to its works at Craigmont, Ont., and hereafter no office will be maintained in the former city.

The Wallace-Lindesmith Hoist Company, Los Angeles, Cal., has decided to locate a branch plant at Fort Wayne, Ind. The company has a well equipped plant at Los Angeles where it manufactures concrete lumber and friction hoists, concrete mixers, carts and wheelbarrows.

The Oil City Gas Engine Starter Company, whose plant is at Siverly, near Oil City, Pa., is about to put two gas engines of different styles on the market. One will be an upright four-cycle engine from 1½ to 3½ hp., and the other a horizontal two-cycle engine from 5 to 30 hp. J. F. Davis is president; W. Corse, treasurer; C. Hoffman, secretary, and J. Bromely, general manager.

The business of Nicholas Gibney, Phillipsburg, N. J., dealer in new and old iron, steel and other metals, has been taken over by the Gibney Iron, Steel & Cement Company, which was recently incorporated. The company's yard, shop and offices are located at First and North Main streets and the Pennsylvania Railroad. Nicholas Gibney is president and treasurer; James P. Monahan, vice-president and general manager, and C. T. Gibney, secretary.

The Indiana Galvanizing & Mfg. Company, Anderson, Ind., has installed an electro-galvanizing plant, supplied with one 22-ft. bar iron tank, besides two other tanks for galvanizing plates, castings and stamp and forge work. The management of this company is identical with that of the Spring Steel Fence & Wire Company, located on the same grounds.

The Automatic Emergency Uncoupler Company, Rockford, Ill., has been incorporated with a capital stock of \$20,000, to manufacture railroad supplies, the chief specialty of which will be an emergency uncoupler invented by E. H. Flannery. This device is designed to automatically cut off the engine from the train and set the brakes in case of accident.

We are advised that the printed statement that the output of the Connellsville Central Coke Company is controlled by J. H. Hillman & Son, Frick Building, Pittsburgh, is not entirely correct. The Connellsville Central Coke Company sells a part of its product to J. H. Hillman & Son, but this concern does not exclusively control the company's output, as the statement previously printed might indicate.

Vollkommer & Hagan, Empire Building, Pittsburgh, have received a contract from the Pressed Steel Sanitary Company, Detroit, Mich., for a double annealing furnace, work on which will be started in about two weeks.

The recently incorporated Atlanta Blow Pipe & Mfg. Company, Atlanta, Ga., will erect a two-story brick building, 75 x 100 ft., which it will equip with machinery for the manufacture of fans, dust collectors, blow pipes and structural ironwork.

The strike of the union machinists in Cleveland, Ohio, which was scheduled to go into effect June 3, provided the employers refused to grant the demands of the union machinists, was started against two concerns last week, as the result of the discharge of a number of union men. The union machinists were called out at the plants of the Long Arm System Company and the Garford Company. Each of these concerns is largely engaged in the manufacture of automobile parts, and some of the machinists were laid off, it is claimed, because of the usual falling off in the demand for automobile parts at this time of the year. The union men claim that they were laid off because of their demands, and the strike against the two establishments was ordered to go into effect at once. The Cleveland union machinists demand a nine-hour day with the same pay that they are now receiving for 10 hours' work. The union claims to have 2000 members in the city, but employers claim that not over about 1500 of the Cleveland machinists are affiliated with the union. The employers seem determined to resist the demands of the machinists' union.

The Tennessee Coal, Iron & Railroad Company and the Republic Iron & Steel Company have removed their executive offices in New York and their Eastern sales offices from the eighth floor of the Trinity Building, 111 Broadway, to the fifteenth floor of the Realty Building, 115 Broadway.

The Iron and Metal Trades

All the leading distributing markets agree in describing the volume of buying in Pig Iron as rather light, but concur in noting that prices remain firm. A Chicago interest has purchased a cargo of 5000 tons of Middlesbrough Iron now afloat, which reflects the scarcity of Iron for early delivery. Pittsburgh has purchased 6000 tons of Low Phosphorus Iron for the last quarter, there being quite a demand for this grade of Iron, at prices which are slightly below the cost of importation.

Foreign advices indicate that the Germans show little disposition to buy Middlesbrough Iron above the level of 57½ to 58 shillings, and the warrant market has, therefore, fluctuated uncertainly. It dropped to 59½ shillings, but is back to-day to 60 shillings.

There continue to be moderate sales of Southern Iron for delivery during the first quarter and first half of 1908, on the basis of \$18 to \$18.50, Birmingham.

A demand has been made upon the makers of Pig Iron in the Pittsburgh and adjoining districts by some of the men for an eight-hour day and advanced wages, to take effect on July 1. The reduction of hours and the higher rates figure out an increase of nearly 50 per cent., which is regarded as rather unreasonable.

A good deal of further Steel Rail business has been done. This includes 35,000 tons for the Northern Pacific road, to be rolled by the Lackawanna Steel Company partly this year and partly in 1908, 30,000 tons for the Southern Railway to the Tennessee Company, and 30,000 tons for Canada. The Southern Railway is in the market for 10,000 tons of Bessemer Rails for delivery next month and July, with further quantities likely to come out. It is understood that the Atchison is in the market for 30,000 tons for 1908, and that the Chesapeake & Ohio is inquiring for 11,000 tons. The Harriman inquiry for 30,000 tons of Bessemer rails for the second half of 1908 has been withdrawn.

It is estimated in Chicago that the local and Kansas City territory will during the next six months yield a total tonnage of orders of 190,000 tons of Structural Material, which includes about 25,000 tons for track elevation and depot purposes for the Chicago & Northwestern. During the last week a number of contracts have been placed, among them 4700 tons for two bascule bridges over the Chicago River, 4500 tons for construction at Gary, and 3500 tons for the Clinton, Iowa, bridge of the Chicago & Northwestern. A preliminary estimate indicates that the total tonnage of Structural Work placed during May footed up close to 150,000 tons.

The outrageous labor situation in San Francisco, and the apparent determination of the banks not to lend money, are putting a sharp check upon building operations there, with little prospect of a demand for Structural Material from that quarter.

The implement manufacturers have thus far placed a total of about 125,000 tons of Bars and Shapes for delivery during the season ending July 1, 1908. Some additional tonnage is now under negotiation. The placing of unusually large contracts in the face of an uncertain crop outlook is explained by the fact that after a short crop year the farmers usually plant a much larger acreage.

The implement makers are relying upon that demand next spring in arranging for their deliveries of material.

An extraordinary condition of affairs exists in the seaboard Scrap trade, brought about by heavy contracts for the delivery of Steel Melting Scrap, which were made by dealers with consumers some months ago. The dealers had little of the material on hand, but expected to be able easily to secure what they needed and at remunerative prices. They have never since found enough available to cover their contracts even when much higher prices are offered than those at which they sold. The situation has now become acute, as consumers are insisting on better deliveries.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	May29, 1907.	May22, 1907.	May1, 1907.	May30, 1906.
PIG IRON, Per Gross ton:				
Foundry No. 2, Standard, Philadelphia	\$25.50	\$25.50	\$24.50	\$18.50
Foundry No. 2, Southern, Cincinnati	24.25	24.25	24.25	16.75
Foundry No. 2, Local, Chicago ..	26.50	26.50	26.50	18.50
Bessemer, Pittsburgh	24.35	24.15	23.85	18.10
Gray Forge, Pittsburgh	22.90	22.85	21.85	16.35
Lake Superior Charcoal, Chicago	27.50	27.50	27.00	19.00

BILLETS, &c., Per Gross Ton:				
Bessemer Billets, Pittsburgh ..	30.00	30.00	30.50	26.00
Forging Billets, Pittsburgh ..	35.00	35.00	36.00	32.00
Open Hearth Billets, Phila.	32.50	32.50	32.50	28.00
Wire Rods, Pittsburgh	37.00	37.00	37.00	34.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL, Per Gross ton:				
Steel Rails, Melting, Chicago ..	18.50	18.50	18.00	14.00
Steel Rails, Melting, Phila.	19.50	19.50	19.25	16.25
Iron Rails, Chicago	24.50	24.50	24.50	21.25
Iron Rails, Philadelphia	27.50	27.50	27.25	21.00
Car Wheels, Chicago	25.50	25.50	25.00	19.00
Car Wheels, Philadelphia	25.50	25.50	24.00	16.50
Heavy Steel Scrap, Pittsburgh ..	18.50	18.00	18.00	14.50
Heavy Steel Scrap, Chicago	16.00	15.50	15.50	14.00
Heavy Steel Scrap, Philadelphia	19.00	19.00	18.75	16.00

FINISHED IRON AND STEEL,

	Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined Iron Bars, Philadelphia.	1.83½	1.83½	1.83½	1.63½	
Common Iron Bars, Chicago ..	1.76½	1.76½	1.76½	1.66½	
Common Iron Bars, Pittsburgh.	1.75	1.75	1.80	1.50	
Steel Bars, Tidewater, New York	1.84½	1.84½	1.74½	1.64½	
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.50	
Tank Plates, Tidewater, New York	1.84½	1.84½	1.84½	1.74½	
Tank Plates, Pittsburgh	1.70	1.70	1.70	1.60	
Beams, Tidewater, New York ..	1.84½	1.84½	1.84½	1.84½	
Beams, Pittsburgh	1.70	1.70	1.70	1.70	
Angles, Tidewater, New York ..	1.84½	1.84½	1.84½	1.84½	
Angles, Pittsburgh	1.70	1.70	1.70	1.70	
Skelp, Grooved Steel, Pittsburgh	1.85	1.85	1.85	1.57½	
Skelp, Sheared Steel, Pittsburgh.	1.90	1.90	1.90	1.60	

SHEETS, NAILS AND WIRE,

	Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, No. 27, Pittsburgh	2.50	2.50	2.50	2.25	
Wire Nails, Pittsburgh	2.00	2.00	2.00	1.85	
Cut Nails, Pittsburgh	2.05	2.05	2.05	1.80	
Barb Wire, Galv., Pittsburgh ..	2.45	2.45	2.45	2.30	

	Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake Copper, New York	24.25	24.62½	25.00	18.75	
Spelter, New York	6.45	6.45	6.60	5.90	
Spelter, St. Louis	6.30	6.35	6.45	5.85	
Lead, New York	6.00	6.00	6.10	6.00	
Lead, St. Louis	5.92½	5.92½	5.92½	5.90	
Tin, New York	42.50	43.75	43.05	41.00	
Antimony, Hallett, New York ..	17.00	17.00	21.00	27.00	
Nickel, New York	45.00	45.00	45.00	40.00	
Tin Plate, 100 lb., New York ..	\$4.09	\$4.09	\$4.09	\$3.94	

Chicago.

FISHER BUILDING, May 29, 1907.—(By Telegraph.)

The interest manifested in building and construction work is strongly reflected in the remarkably well sustained demand for Structural Material. A large amount of new tonnage is coming forward and but few of the important deals figured on are being unduly deferred. Plans now under way in Chicago and Kansas City alone contemplate the placing of 190,000 tons of Structural Material within the next six months. Rail purchases, though less in volume than for the preceding week, were by no means insignificant, 41,000 tons being taken by Western lines, of which 10,000 tons went to the Tennessee Company. The question of Rail qualities and the relative merits of the Bessemer and Open Hearth product are exciting much discussion among the railroad and Steel-making interests. Specifications on contracts for all lines of finished products show no signs of lagging, but in some departments new business is not developing as rapidly as heretofore. Steel Bars continue active, the buying for the week being distributed among many interests. Scrap material shows unusual strength, and scarcity marks the supply of all Cast and Melting grades. Higher prices, ranging from 50c. to \$1 a ton on various grades, now rule. Pig Iron is inactive and featureless save for the engagement of a 5000-ton cargo of Middlesbrough Iron for this market. Sales are mainly restricted to small and moderate sized lots, principally for third and fourth quarter delivery. Despite the quiet demand and meagerness of inquiries, prices are not only firmly held, but there is talk of still higher figures for last half requirements.

Pig Iron.—The record of transactions for the past week is wholly lacking in incidents of a stirring nature. Extreme quietness pervades the market, unbroken by any movement that might reasonably be construed as indicating active interest in purchases for either present or forward deliveries. Prices are nevertheless firmly held, and sellers display no eagerness in pressing sales. At least two important interests are practically out of the market, and are at the present time booking no business in this territory for this year's delivery. That melters are generally well supplied for present needs is evidenced by the very light demand for spot iron. For Iron on track \$23 is quoted, though it is not unlikely that this price is being shaded 50 cents, especially on some scattered car lots of resale iron. A few sales for shipment from Southern furnaces, amounting in all to perhaps 1500 tons, have been made for delivery through the first half of next year. From \$18.50 to \$19 are the prices named by the few interests quoting for that period. A cargo of Middlesbrough Iron, comprising 5000 tons, is now afloat, destined for this market. Imports of this character emphasize the unusual conditions existing in domestic production. Quotations for No. 2 Southern Foundry remain at \$21.50 for third and \$20, Birmingham, for fourth quarter. Virginia Iron is quoted at \$23 for third quarter and \$22 for fourth quarter, and Basic at \$24 for last half, at furnace. For Northern Foundry No. 2 \$25 to \$25.50 is asked for the last half. The following prices are for May and June delivery, f.o.b. Chicago:

Lake Superior Charcoal.....	\$27.50 to \$28.00
Northern Coke Foundry, No. 1.....	27.00 to 27.50
Northern Coke Foundry, No. 2.....	26.50 to 27.00
Northern Coke Foundry, No. 3.....	26.00 to 26.50
Northern Scotch, No. 1.....	27.00 to 27.50
Ohio Strong Softeners, No. 1.....	26.50 to 27.00
Ohio Strong Softeners, No. 2.....	26.00 to 26.50
Southern Coke, No. 1.....	27.35 to 27.85
Southern Coke, No. 2.....	26.85 to 27.35
Southern Coke, No. 3.....	26.35 to 26.85
Southern Coke, No. 4.....	25.85 to 26.35
Southern Coke, No. 1 Soft.....	27.35 to 27.85
Southern Coke, No. 2 Soft.....	26.85 to 27.35
Southern Gray Forge.....	25.35 to 25.85
Southern Mottled.....	25.35 to 25.85
Malleable Bessemer.....	26.50 to 27.00
Standard Bessemer.....	25.30 to 25.80
Jackson Co. and Kentucky Silvery, 6 %.....	31.30 to 31.80
Jackson Co. and Kentucky Silvery, 8 %.....	32.30 to 32.80
Jackson Co. and Kentucky Silvery, 10 %.....	33.30 to 33.80

(By Mail.)

Billets and Rods.—The principal makers of Rods have very little surplus over their own requirements, and beyond taking care of regular customers are offering but little tonnage in the open market. For carloads and small lots prices range from \$37 to \$38, Pittsburgh. Forging Billets for current lots of small tonnage are quoted at \$38 and upward, according to size.

Rails and Track Supplies.—Last week's buying of Standard Section Rails has added 41,000 tons to the total already placed by Western roads. Of this 21,000 tons was taken by the Illinois Steel Company and 10,000 tons by the Tennessee Company. Inquiries for a considerable tonnage of Light Rails in fair sized lots are in the market, but no sales of importance are reported. The leading Western mills are booked well ahead on this material, and are not in position to promise deliveries short of October. Track Supplies are in good demand, and Spikes are especially active. We quote as follows: Angle Bars, accompanying Rail orders, 1907 delivery, 1.65c.; car lots, 1.90c. to 1.95c.; Spikes, 2.35c. to 2.45c., according to delivery; Track Bolts, 2.65c. to 2.75c., base, Square Nuts, and 2.80c. to 2.90c., base, Hexagon Nuts. The store prices on Track Supplies range from 0.15c. to 0.20c. above mill prices. Light Rails, 30 to 45 lb. sections, \$35; 25-lb., \$36; 20-lb., \$37; 16-lb., \$38; 12-lb., \$39, f.o.b. mill. Standard Sections \$28, f.o.b. mill, full freight to destination.

Structural Material.—New enterprises involving the use of Structural Material are developing in an encouraging manner, and work already planned is maturing into contracts as rapidly as could be expected. It is estimated that in the cities of Chicago and Kansas City the work now in sight should, barring untoward happenings, result in contracts for 190,000 tons before the close of the year. Among the recent contracts let are 4700 tons for two bascule bridges over the Chicago River, taken by the Toledo-Massillon Bridge Company, Toledo; 1000 tons for the Eighteenth street viaduct, St. Louis, which went to the Missouri Bridge & Iron Works. The new work up for figures includes two steamboat hulls for the Wiggins Terminal Company, St. Louis, requiring about 1500 tons; an additional power house and stripper building at the new Steel Works plant, Gary, Ind., 4500 tons, and the A. L. Straus Mercantile Building, Chicago, 500 tons. Prices from store are quoted without change at 2.05c. to 2.10c., and mill prices, at Chicago, including 1½c. per 100 lb. advance in freight rates, effective June 1, are as follows: Beams and Channels, 3 to 15 in. inclusive, 1.88c.; Angles, 3 to 6 in., ¼-in. and heavier, 1.88c.; larger than 6 in. on one or both legs, 1.98c.; Beams, larger than 15 in., 1.98c.; Zees, 3 in. and over, 1.88c.; Tees, 3 in. and over, 1.93c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending and other shop work.

Plates.—The mills report from week to week but little progress in their efforts to overhaul their extended delivery-dates. But in some quarters there are evidences that furnish hope for a betterment of conditions in the not distant future; for while specifications are still being furnished freely, the total volume of new business is somewhat lessened. From a few sources reasonably prompt shipment can be had, but such service still commands prices above regular quotations. We quote for future delivery, including the 1½c. for 100 lb. advance in freight rate, effective June 1, as follows: Tank Plates, ½-in. and heavier, wider than 6¼ and up to 100 in. wide, inclusive, car lots, Chicago, 1.88c. to 2.08c.; 3-16 in., 1.98c. to 2.18c.; Nos. 7 and 8 gauge, 2.03c. to 2.23c.; No. 9, 2.13c. to 2.33c.; Flange quality, in widths up to 100 in., 1.98c. to 2.08c., base, for ¼-in. and heavier, with the same advance for lighter weights; Sketch Plates, Tank quality, 1.98c. to 2.18c.; Flange quality, 2.08c. Store prices on Plates are as follows: Tank Plates, ¼-in. and heavier, up to 72 in. wide, 2.20c. to 2.30c.; from 72 to 96 in. wide, 2.30c. to 2.40c.; 3-16 in., up to 60 in. wide, 2.30c. to 2.40c.; 72 in. wide, 2.50c. to 2.65c.; No. 8 up to 60 in. wide, 2.35c. to 2.45c.; Flange and Head quality, 0.25c. extra.

Sheets.—For both Black and Galvanized Sheets the demand is extremely heavy, the latter being as far delinquent in shipment as heretofore. Store stocks constitute about the only available source for spot requirements. We quote mill shipments, including the 1½c. per 100 lb. advance in freight rate, effective June 1, as follows, Chicago: Blue Annealed, No. 10, 2.03c.; No. 12, 2.08c.; No. 14, 2.13c.; No. 16, 2.23c.; Box Annealed, Nos. 17 to 21, 2.53c.; Nos. 22 to 24, 2.58c.; Nos. 25 to 26, 2.63c.; No. 27, 2.68c.; No. 28, 2.78c.; No. 29, 2.88c.; No. 30, 2.98c.; Galvanized Sheets, Nos. 10 to 14, 2.83c.; Nos. 15 and 16, 3.03c.; Nos. 17 to 21, 3.18c.; Nos. 22 to 24, 3.33c.; Nos. 25 and 26, 3.53c.; No. 27, 3.73c.; No. 28, 3.93c.; No. 30, 4.43c. Sheets from store: Blue Annealed, No. 10, 2.50c.; No. 12, 2.55c.; No. 14, 2.60c.; No. 16, 2.70c.; Box Annealed, Nos. 18 to 21, 2.80c.; Nos. 22 to 24, 2.85c.; No. 26, 2.90c.; No. 27, 2.95c.; No. 28, 3.05c.; No. 30, 3.45c.; Galvanized from store: Nos. 10 to 20, 3.30c. to 3.35c.; Nos. 22 to 24, 3.55c. to 3.60c.; No. 26, 3.65c. to 3.70c.; No. 27, 3.85c. to 3.95c.; No. 28, 4.15c.; No. 30, 4.65c. to 4.70c.

Bars.—An active demand for Steel Bars still exists, and the total tonnage already placed is sufficient to engage the rolling capacity of Western mills far into the second half of the year. Numerous orders of moderate tonnage booked during the past week represent the requirements of various interests, of which the car builders have been an important factor. It is believed that a large majority of the implement makers have now covered their season's requirements, and the few that have not done so are rapidly coming in. Quotations, Chicago, including the 1½c. per 100 lb. advance in freight rate, effective June 1, are as follows: Steel Bars, 1.78c., with half extras; Iron Bars, 1.78c.; Hoops, 2.18c., extras as per Hoop card; Bands, 1.78c., as per Bar card, half extras; Soft Steel Angles and Shapes, 1.88c., half extras. Store prices are as follows: Bar Iron, 2.10c. to 2.25c.; Steel Bars, 2c. to 2.10c.; Steel Bands, 2c., as per Bar card, half extras; Soft Steel Hoops, 2.35c. to 2.45c., full extras.

Merchant Pipe.—The only complaint heard respecting the condition of the Pipe market is that of slow delivery and consequent scarcity. The market readily absorbs all the mills are able to produce. The following mill discounts are quoted, which include the 1½c. per 100 lb. advance in freight rates, effective June 1: Black Pipe, ¾ to 8 in., 71.2; 7 to 12 in., 68.2; Galvanized, ¾ to 6 in., 61.2. These discounts are subject to 1 point on the base. From store in small lots, Chicago jobbers' quote 68 per cent. on Black Steel Pipe, ¾ to 6 in. About 4 points advance above these prices is asked for Iron Pipe.

Boiler Tubes.—An active demand is noticed for Merchant Tubes, which are especially strong from store stocks. Mills have not yet caught up on orders sufficiently to make prompt deliveries on either Merchant or Locomotive Tubes. Mill quotations for future delivery on base sizes, which include the 1½c. per 100 lb. advance in freight rate, effective June 1, are as follows: 2¼ to 5 in., in carload lots, Steel Tubes, 63.2; Iron, 50.2; Seamless, 49.2; 2½ in. and smaller, and lengths over 18 ft., and 2½ in. and larger, and lengths over 22 ft., 10 per cent. extra. Store prices are as follows:

	Steel.	Iron.	Seamless.
1 to 1½ in.....	35	35	35
1½ to 2¼ in.....	50	35	35
2¼ in.....	52½	35	35
2½ to 5 in.....	60	47½	47½
6 in. and larger.....	50	35	..

Merchant Steel.—Orders are plentiful for moderate sized lots of Tire Steel and Implement Shapes. Prices are well maintained on all grades, except Shafting, on which some shading in discount is reported. Quotations include the 1½c. per 100 lb. advance in freight rates, effective June 1, and are as follows: Planished or Smooth Finished Tire Steel, 1.98c.; Iron Finish, up to 1½ x ½ in., 1.93c.; Iron Finish, 1½ x ½ in. and larger, 1.78c., base; Channels for

solid rubber Tires, $\frac{3}{4}$ to 1 in., 2.28c., and $1\frac{1}{2}$ -in. and larger, 2.18c.; Smooth Finished Machinery Steel, 2.18c.; Flat Sleigh Shoe, 1.93c.; Concave and Convex Sleigh Shoe, 2.08c.; Cutter Shoe, 2.46 $\frac{1}{2}$ c.; Toe Calk Steel, 2.33c.; Railroad Spring, 1.98c.; Crucible Tool Steel, $7\frac{1}{4}$ c. to 8c., and still higher prices are asked on special grades. Shafting, 50 per cent. off in car lots and 45 per cent. in less than car lots, base territory.

Cast Iron Pipe.—With no inquiries for or lettings of any considerable quantities in the market, business is very quiet. Only the regular run of small orders, which continue in fair volume, keeps the market from extreme dullness. We quote per net ton, Chicago, as follows: Water Pipe, 4-in., \$38 to \$39; 6 to 12 in., \$37 to \$38; 16-in. and up, \$36 to \$37, with \$1 extra for Gas Pipe.

Coke.—The demand for Foundry Coke is only fair, though some contracting for forward deliveries is noted as a result of present favorable prices. Connellsville 72-hr. Foundry Coke is quoted at \$3.25 to \$3.50. Solvay Coke for forward delivery is quoted at \$6.50, Chicago.

Old Material.—The market is decidedly firm and stronger, with a tendency toward advances on all grades. Cast Scrap of all kinds is scarce, and is in good demand. Recent purchases of relatively large tonnages of Malleable stock have been followed by a sharp advance on both agricultural and railroad grades, ranging from 50c. on the former to \$1.25 on the latter. Users of Heavy Melting Steel are also buying freely. Good prices have been realized on railroad offerings, a round lot of No. 1 Wrought on a recent list bringing \$16.40. The only list out this week is that of the Baltimore & Ohio, representing 7500 tons, to be closed June 1. The following quotations are per gross ton, f.o.b. Chicago:

Old Iron Rails.....	\$24.50 to \$25.00
Old Steel Rails, rerolling.....	19.00 to 19.50
Old Steel Rails, less than 3 ft.....	18.50 to 19.50
Relaying Rails, standard sections, subject to inspection.....	28.00 to 30.00
Old Car Wheels.....	25.50 to 26.00
Heavy Melting Steel Scrap.....	16.00 to 16.50
Frogs, Switches and Guards, cut apart.....	17.00 to 17.50
Mixed Steel.....	12.50 to 13.00

The following quotations are per net ton:

Iron Fish Plates.....	\$19.00 to \$20.00
Iron Car Axles.....	26.00 to 26.50
Steel Car Axles.....	21.00 to 21.50
No. 1 Railroad Wrought.....	16.00 to 16.50
No. 2 Railroad Wrought.....	15.00 to 15.50
Railway Springs.....	15.50 to 16.00
Locomotive Tires, smooth.....	17.50 to 18.00
No. 1 Dealers' Forge.....	13.00 to 13.50
Mixed Bushing.....	12.00 to 12.50
Iron Axle Turnings.....	12.50 to 13.00
Soft Steel Axle Turnings.....	12.50 to 13.00
Machine Shop Turnings.....	12.50 to 13.00
Cast Borings.....	10.50 to 11.00
Mixed Borings, &c.....	10.50 to 11.00
No. 1 Mill.....	10.00 to 10.50
No. 2 Mill.....	9.00 to 9.50
No. 1 Boilers, cut to Sheets and Rings.....	11.50 to 12.00
No. 1 Cast Scrap.....	18.75 to 19.25
Stove Plate and Light Cast Scrap.....	15.25 to 15.75
Railroad Malleable.....	17.25 to 17.75
Agricultural Malleable.....	15.50 to 16.00
Pipe and Flues.....	12.25 to 12.75

Metals.—No noteworthy movement is noticed in any of the Metals trade, being limited to the usual normal requirements. We quote as follows: Casting Copper, 25 $\frac{1}{2}$ c. to 26c.; Lake, 26c. to 26 $\frac{1}{2}$ c., in car lots for prompt shipment; small lots, $\frac{1}{4}$ c. to $\frac{3}{4}$ c. higher; Pig Tin, car lots, 45 $\frac{1}{4}$ c.; small lots, 45 $\frac{1}{2}$ c.; Lead, Desilverized, 6.50c. to 6.60c., for 50-ton lots; Corroding, 7.25c. to 7.35c., for 50-ton lots; in car lots, 2 $\frac{1}{4}$ c. per 100 lb. higher; Spelter, 6.87 $\frac{1}{2}$ c.; Cookson's Antimony, 27 $\frac{1}{2}$ c., and other grades, 26 $\frac{1}{2}$ c. to 27c.; Sheet Zinc is \$8.60 list, f.o.b. La Salle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 20 $\frac{3}{4}$ c.; Heavy Copper Wire, 21c.; Copper Bottoms, 19 $\frac{1}{4}$ c.; Copper Clips, 20c.; Red Brass, 19 $\frac{1}{4}$ c.; Red Brass Borings, 17 $\frac{1}{4}$ c.; Yellow Brass, 17c.; Yellow Brass Borings, 14 $\frac{1}{4}$ c.; Light Brass, 13c.; Lead Pipe, 5 $\frac{1}{4}$ c.; Tea Lead, 5.40c.; Zinc, 5.40c.; Pewter, No. 1, 30c.; Tin Foil, \$35c.; Block Tin Pipe, 40c.

Some time ago the master mechanic employed at the plant of the Colonial Steel Company, Colonia, Pa., was discharged for cause, and the entire mechanical force went out on strike when he left. The places of these men have been filled and every department at this works is now in full operation and turning out its maximum product. Owing to the large increase in its Eastern trade the company has removed its warehouse in New York City to 177-179 Hudson street and 27-29 Vestry street, where it will have better facilities and will carry a much larger stock, from which orders for high speed tool steels, medium carbon, smooth finished machinery and spring steel can be furnished promptly.

Philadelphia.

PHILADELPHIA, PA., May 28, 1907.

The situation is about the same as last week, so far as regards prices, but the demand is somewhat lighter. This, however, is only what might be expected after the heavy tonnages which were taken during the last 10 or 15 days. It is not clear why buyers should have made such a complete surrender as they have done during the period just mentioned. Several of the largest consumers had determined not to pay more than \$22 to \$22.50 for deliveries of Basic during the last quarter of this year, but the majority of them finally decided to cover at prices averaging \$1 to \$1.50 more than the figures mentioned. What decided them in this course is not very clear, except that they were afraid of the shortage continuing several months longer, and rather than take risks of that kind they paid the prices demanded by the producers, so as to feel sure of getting Iron when they need it, although it is not clear how that will help them. If there is a shortage it has to be shared, *pro rata*, so that advance buying will not do much good unless prices advance, which under present conditions does not appear to be at all probable. This also applies in some measure to Foundry Irons, although perhaps not to so great an extent as in Steel making Irons. Whether the policy which has been adopted is a wise one or not remains to be seen, although it will undoubtedly enable producers to maintain high prices for a longer period than they probably would have done if these purchases had not been made.

Pig Iron.—The market appears to be a shade quieter than it was a week ago, but prices are steady, and will probably show no indications of weakness for some time to come. The selling interests have the situation so well in hand that they will have full control of the market, until an actual surplus of Pig Iron starts competition and after that the deluge. Nothing of that kind need be expected at present, however, as the output for 1907 is mostly under contract, and will no doubt be taken in due course. The increased output by furnaces is expected to relieve the situation considerably during the summer months, and by that time something definite may be developed in regard to the outlook for consumption in 1908. The immediate outlook is certainly not encouraging, and if developments continue on the same lines as during the past weeks the entire situation will be in serious jeopardy. There are a great many influences liable to come up, which, although they may have no direct bearing on the Iron trade, may nevertheless precipitate worldwide disturbances, and until these are at least measurably adjusted, it is impossible to feel much confidence in the continuance of the present high degree of prosperity in the Iron trade. The scramble for gold in Europe and the possibility of calls being made on the United States for the precious metal are not pleasant features, especially when the United States Treasury is also expected to call in sundry millions within the next 30 days. The railroads are also badly in need of money, which if not obtained must undoubtedly restrict their expenditures for improvements and extensions. The ordinary method in times of financial stress is a general curtailment in expenditures, and there is no reason why an exception should be made at this time. A reduction in the demand for Rails of 500,000 tons within the next 12 months would make a tremendous difference in the Steel situation, yet, in case of continued financial stringency, such a reduction and more might easily be made. If there has got to be a cutting down in demand, there must be a corresponding cutting down in prices, which are phenomenally high, even if outside conditions were as bright as they were a year ago; when, as a matter of fact, prices at that time were \$5 to \$6 a ton less than they are to-day. This view of the situation is presented simply because in any unprejudiced review it is only fair that every aspect of the situation should receive due consideration. Many of our readers are extremely sensitive in regard to what may be said in *The Iron Age*, especially when it is not in accord with their interests, but the intention is to serve not one interest at the expense of another, but all interests, without fear and without favor. For the present it must be fully conceded that prices are strong, and that so far as appears on the surface there is no more likelihood of a decline now than at any time within the past six months. Foundry Grades command the full prices quoted last week, and the same may be said in regard to Basic and Mill Irons, while Low Phosphorus is decidedly dearer. There is quite a good demand for the latter, and \$27.50 to \$28 would be as low as could be done for either foreign or domestic delivered to buyers at nearby points. The foreign market is bare of stock, and it is doubtful if, for that article, anything less than the inside figure could be done delivered along side ship, duty paid. The present range of prices for the various dates for delivery would be about as follows, consumers' yards, eastern Pennsylvania or adjoining districts:

May and June Deliveries.

No. 2 X Foundry.....	\$25.50 to \$26.50
Gray Forge.....	22.75 to 23.25
Basic.....	24.75 to 25.00
Middlesbrough, No. 3.....	22.50 to 23.00
Scotch Iron.....	24.50 to 25.00

Third Quarter 1907.

No. 2 X Foundry.....	\$24.50 to \$25.00
Gray Forge.....	22.50 to 22.75
Basic.....	23.75 to 24.25
Low Phosphorus.....	27.50 to 28.00

Fourth Quarter 1907.

No. 2 X Foundry.....	\$23.50 to \$23.75
Basic.....	23.00 to 23.50
Gray Forge.....	22.00 to 22.50
Low Phosphorus.....	27.50 to 28.00

Ferroalloys.—Some business has been done during the past few days at the prices quoted last week, and there is further inquiry which will probably result in business at about the same figures, namely \$63, for deliveries during the last half, or from \$65 to \$67 for June deliveries. The market is very erratic, however, and is liable to sudden changes, as some importers consider that even these prices are rather low.

Steel.—There is a good demand for Steel, and mills are doing a little better than they have for some time past. New business has been given out in moderate volume and renewal orders are well up to an average. Prices remains as last quoted, namely, \$32.50 to \$33 for nearby deliveries of ordinary Rolling Billets, and \$36 to \$38 for Forging Steel.

Structural Material.—The situation is about the same as it has been for several weeks. Enough business comes in from week to week to keep the mills fully employed, without adding any considerable amount for future delivery. As a rule, prompt shipments can be made of almost anything, and even good sized lots could be delivered with not more than three or four weeks' delay. There appears to be a feeling of suspense, however, somewhat in anticipation of a heavier demand in the near future. Prices are steady as last quoted, namely, 1.83½c. to 2c. for Beams, Channels and Angles, according to specification.

Bars.—The demand is a little better than it was a week ago, although it cannot be said to be at all active. The high prices of Scrap and other material make the cost come very high, and even at full quoted prices of 1.83½c. there is little or no margin to the manufacturer. Steel Bars are quoted at 1.73½c., but at that figure deliveries cannot be guaranteed in less than 60 to 90 days or more, so that for prompt shipments prices are about on a parity with Refined Iron.

Sheets.—The demand is quite active and the mills have as much work as they can turn out for some weeks. There is quite a pressure for prompt deliveries, and in some cases a slight premium is paid for immediate shipments, but ordinary quotations for mill shipments are about as follows, with the usual additions for small lots: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 to 26, 3c.; No. 27, 3.10c., and No. 28, 3.20c.

Plates.—The demand for Plates is in satisfactory volume, and renewal orders are coming in freely, in addition to some new business, which, however, is not for very large tonnages. Specifications are coming in more freely and departments which were dull three or four weeks ago are now running pretty well up to their full capacity. Prices are unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel.....	1.93½	1.98½
Flange or Boiler Steel.....	2.03½	2.08½
Marine.....	2.23½	2.28½
Locomotive Firebox Steel.....	2.43½	2.48½
The above are base prices for ¼-in. and heavier. The following extras apply:		
3-16-in. thick.....		100 c.
Nos. 7 and 8, B. W. G.....		15
No. 9, B. W. G.....		25
Plates over 100 to 110 in.....		.05
Plates over 110 to 115 in.....		.10
Plates over 115 to 120 in.....		.15
Plates over 120 to 125 in.....		.25
Plates over 125 to 130 in.....		.50
Plates over 130 in.....		1.00

Old Material.—The market is in a most peculiar condition, and is hard to explain satisfactorily. The supply of Steel Scrap is quite inadequate to meet requirements. Consequently those who sold for forward delivery are unable to meet their engagements, although to get out they are willing to pay a good deal more than they sold it for. This is attributed to the fact that as Scrap Steel is several dollars a ton lower than Pig Iron, a greater proportion of it is used as a substitute, and this has developed a shortage which it is thought cannot be overcome until the prices of the two articles get closer together. Other descriptions of Scrap Material are more or less influenced by the conditions above named, so that on the whole prices are firm, with bids and offers for deliveries in buyers' yards, Philadelphia and nearby districts as follows:

Steel Crops and Ralls.....	\$19.50 to \$20.00
No. 1 Steel Scrap.....	19.00 to 20.00
Low Phosphorus.....	24.50 to 25.00
Old Steel Axles.....	22.00 to 22.50
Old Iron Axles.....	31.50 to 32.00
Old Iron Ralls.....	27.50 to 28.00
Old Car Wheels.....	25.50 to 26.00
Choice No. 1 R. R. Wrought.....	21.00 to 21.50
No. 1 Yard Scrap.....	19.00 to 19.50

Long and Short.....	19.00 to 19.50
Machinery Scrap.....	21.00 to 21.50
Wrought Iron Pipe.....	17.00 to 17.50
No. 1 Forge Fire Scrap.....	16.75 to 17.25
No. 2 Light.....	11.50 to 12.00
Wrought Turnings.....	17.00 to 17.50
Heavy Machinery and Axle Turnings.....	17.25 to 17.75
Stove Plate.....	17.75 to 18.25
Cast Borings.....	16.00 to 16.25
Grate Bars.....	16.75 to 17.25

Pittsburgh.

PARK BUILDING, May 29, 1907.—(By Telegraph.)

Pig Iron.—The past week has been very quiet in the Pig Iron trade, no large lots having been sold. Consumers of Bessemer and Basic are pretty well covered for the balance of this year, and there is little inquiry. We note a sale of 2000 tons of Bessemer for May and June at \$23.50, Valley furnace, and a sale of 1000 tons of Malleable Bessemer for delivery in second half at \$23.25, Valley furnace. We quote Bessemer and Basic Iron for June delivery at \$23.50, Valley furnace, which after June 1 will be equal to \$24.40, Pittsburgh. The freight rate on Pig Iron on June 1 from the valleys to Pittsburgh is to be advanced from 85c. to 90c. There is some inquiry for Foundry Iron for the last half of the year, some of the larger consumers not being covered, but they are averse to paying the high prices asked, and no large lots have been closed up. We quote Northern No. 2 Foundry for prompt delivery at \$25.50 to \$26; for third quarter, \$23.50 to \$24; and for last half \$23 to \$23.50, all at Valley furnace. There is nothing doing in Forge Iron, and we quote Northern makes at \$22 to \$22.25, Valley furnace, or \$22.90 to \$23.15, Pittsburgh.

Steel.—The supply of Billets and Sheet and Tin Bars continues to show improvement, and the mills are making better deliveries. We quote Bessemer Billets at \$30, and Open Hearth at \$31.50, Pittsburgh. We quote Forging Billets at \$35 to \$36, the lower price being for extended delivery and the higher price for prompt shipment. Sheet and Tin Bars in random lengths are held at about \$31, maker's mill, Pittsburgh or Youngstown.

(By Mail.)

The demand for Bessemer and Basic Iron has quieted down decidedly, practically all the important consumers having covered their requirements during the activity about a month ago. Some Basic Iron is available for prompt shipment, but tonnage is not large. It is evident that prices on both Bessemer and Basic for the rest of this year's delivery are as high as they will go, and any change in the market will probably be in the direction of lower prices. It is true that higher prices for new Ore will soon be felt in the making of Iron, but the spread between actual cost, even with new Ores, and present selling prices, is so large that it will take an extraordinary demand for Bessemer and Basic Iron to maintain the present market. There is an active inquiry for Foundry Iron, some of the leading consumers not being covered for the balance of the year and have inquiries in the market for some large tonnage. The betterment in supply of Steel and the easier tone in prices continue, and, with the natural falling off in tonnage by the finishing mills during the hot months, still further improvement in the supply of Steel is expected. In Finished Material the most activity at present is in Steel Bars and in Pipe, in both of which some large tonnage is being placed. No large business is under way in Plates, Sheets or Tin Plate, but the mills making these products are sold up for the next three or four months or even longer. In Structural Shapes the mills have about three months' work ahead, and a good deal of new business is in sight. The Scrap market, which has been dull and weak for some time, is showing betterment. Coke continues dull and very low prices are being made for spot delivery.

Ferromanganese.—The market is somewhat demoralized, and English 80 per cent. Ferro is being offered for June and July delivery as low as \$66, Pittsburgh; but on a firm offer this might be shaded. It is claimed that the present high prices of Manganese Ores do not warrant such a low market on Ferro, and that either prices of Ferro must improve or prices of Ores decline. For delivery over last half of the year foreign Ferro is offered at \$61, Baltimore, or \$62.90, Pittsburgh.

Muck Bar.—There is an active demand for high grade Bar, and the available supply is light. The scarcity of Forge Iron is also affecting the Muck Bar market, which is high and very firm. We quote best grades of Muck Bar made from all Pig Iron at \$38, Pittsburgh, and note a sale of 600 tons for June and July delivery at that price.

Skelp.—Owing to the heavy demand for Pipe, the mills rolling Skelp are congested with business and are sold up

for three or four months ahead. Several mills will not take on tonnage for delivery prior to August or later. Prices are very firm and for forward delivery we quote: Grooved Steel Skelp, 1.85c. to 1.90c.; Sheared Steel Skelp, 1.90c. to 1.95c.; Grooved Iron Skelp, 2.20c. to 2.25c.; Sheared Iron Skelp, 2.30c. to 2.35c.

Rods.—The supply of Rods does not seem to increase, and they are scarce and high for prompt delivery. We continue to quote Bessemer and Open Hearth Rods from \$37 to \$38, Pittsburgh, the higher price being obtainable for prompt deliveries.

Steel Rails.—The market has been very quiet and no tonnage of moment has been placed. The present agitation in regard to breakage of Rails is exciting considerable interest, and may possibly result in the Rail mills putting in equipment for rolling as heavy as 125-lb. Sections. We quote Light Rails as follows: \$33 to \$34 for 20 to 45 lb.; \$34 to \$35 for 16-lb., and \$35 to \$36 for 12-lb., at mill. Angle Splice Bars are held at 1.65c., and Standard Section Rails at \$28, at mill.

Structural Material.—No large contracts have been placed in this district since our last report, but a good deal of work is coming up, some of which will be ready in a short time. Preliminary figuring is being done on the new steel bridge to be built by the Jones & Laughlin Steel Company across the Ohio River, connecting its works at Aliquippa with the Pennsylvania Lines West. This project, if it goes through, will require upward of 10,000 tons of Steel. Some other local work is about ready to place, but new jobs are coming out rather slowly, probably due to some extent to the tightness in the money market. The leading Structural mills have three months' work ahead on Shapes, but on Plates and Steel Bars deliveries are very unsatisfactory. We quote: Beams and Channels, up to 15 in., 1.70c.; over 15-in., 1.80c.; Angles, 3 x 2 x 1/4 in. thick up to 6 x 6 in., 1.70c.; 8 x 8 and 7 x 3 1/2 in., 1.80c.; Zees, 3 in. and larger, 1.70c.; Tees, 3 in. and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3 in. are 1.70c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Plates.—No large work is coming up in Plates, but the car builders, wagon makers and boiler shops are specifying freely against contracts and shipments by the mills are heavy. Some tonnage for reasonably prompt shipment is still being placed at premiums of \$2 to \$3 a ton over official prices. We note a sale of 2500 tons of Plates for delivery as far ahead as November and December at 1.70c., Pittsburgh. We quote: Tank Plates, 1/4-in. thick, 6 1/4 in. up to 100 in. wide, 1.70c. to 1.80c., base, at mills, Pittsburgh. Extras over this price are as follows:

	Extra per 100 lb.
Gauges lighter than 1/4-in. to and including 3-16-in.	
Plates on thin edges.....	\$0.10
Gauges Nos. 7 and 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 in.....	.05
Plates over 110 to 115 in.....	.10
Plates over 115 to 120 in.....	.15
Plates over 120 to 125 in.....	.25
Plates over 125 to 130 in.....	.50
Plates over 130 in.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.).....	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
"A. B. M. A." and ordinary Firebox Steel Plates.....	.20
Still Bottom Steel.....	.30
Marine Steel.....	.40
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within 10 days from date thereof, discount of 1/4 of 1 per cent. is allowable. Pacific Coast base, 1.60c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 in. wide down to 6 in. of Tank, Ship or Bridge quality.

Sheets.—The mills are making better deliveries on Sheets than for some time, and the supply of Bars is reported as a little better. New business coming in is not quite as heavy as in April, but this is rather pleasing to the mills, as it will give them a better chance to catch up on deliveries, on which they are still much behind, especially on Galvanized Sheets. For prompt delivery, Sheets continue to command premiums anywhere from \$2 to \$4 a ton, depending on specifications and shipments wanted. For forward delivery we quote: Blue Annealed Sheets, No. 10 gauge and heavier, 1.85c.; Nos. 11 and 12, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2.05c.; Box Annealed, Nos. 17 to 21, 2.35c.; Nos. 22 to 24, 2.40c.; Nos. 25 and 26, 2.45c.; No. 27, 2.50c.; No. 28, 2.60c.; No. 29, 2.75c.; No. 30, 2.85c. We quote Galvanized Sheets as follows: Nos. 10 and 11, 2.65c.; Nos. 12 and 14, 2.75c.; Nos. 15 and 16, 2.85c.; Nos. 17 to 21, 3c.; Nos. 22 and 24, 3.15c.; Nos. 25 and 26, 3.35c.; No. 27, 3.55c.; No. 28, 3.75c.; No. 29, 4c., and No. 30, 4.25c. We quote No. 28 gauge Painted Roofing Sheets at \$1.85 per square, and Galvanized Roofing Sheets, No. 28 gauge, \$3.25 per square, for 2-in. corrugations. These prices are for carload lots, jobbers charging the usual advances.

Hoops and Bands.—Some new tonnage is being placed for prompt shipment, and it commands premiums of as high as \$2 a ton over prices for forward delivery, which are as follows: Steel Hoops, 2c., and Bands for all purposes at 1.60c., base, half extras, as per Standard Steel card. These prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery, an advance of \$2 a ton being charged for less than carloads.

Cotton Ties.—Practically all of the season's contracts for Cotton Ties have been placed, the mills reporting as having upward of 2,000,000 bundles on their books, all taken at the official price of 95c. a bundle.

Tin Plate.—New demand for Tin Plate is only fairly active, large consumers being covered through third quarter, while some business has been placed for last quarter of the year delivery. It is generally accepted that no change in prices will be made for delivery this year, and for this reason there is not much urgency on part of consumers to cover for last quarter of the year. Reports that some leading consumers had requested postponement of shipments have been exaggerated, the amount of such tonnage being insignificant. We quote for third and fourth quarter delivery as follows: \$3.90 for 100-lb. Cokes, f.o.b. Pittsburgh, for 14 x 20 100-lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days, on which price a rebate of 5c. a box is allowed for carload and larger lots.

Bars.—It is estimated that the implement makers have placed contracts for Steel Bars for delivery up to July 1 of next year, amounting to 125,000 tons or more, practically all of this business going to the three leading local mills, these being the Carnegie Steel Company, Republic Iron & Steel Company and Jones & Laughlin Steel Company. A good deal of tonnage of this character remains to be placed, and it is coming forward quite freely. Steel Bars for prompt delivery continue to command \$3 to \$4 a ton premium over the regular price of 1.60c. There is a moderate demand for Iron Bars and some of the mills can make reasonably prompt shipments. We quote Refined Iron Bars at 1.75c. to 1.80c., Pittsburgh, and Steel Bars for forward delivery at 1.60c., base, half extras, f.o.b. Pittsburgh.

Spelter.—New business being placed is light and prices are weak. We quote prime grades of Western Spelter at 6.30c., St. Louis, equal to 6.42 1/2c., Pittsburgh.

Railroad Spikes.—The demand is not quite as active as it was some time ago, particularly for the larger sizes, but for the smaller sizes there is a moderate demand and prices are firm. We quote Standard Sizes at \$2.25, and the smaller sizes at \$2.35 to \$2.40 per 100 lb. f.o.b. Pittsburgh.

Merchant Pipe.—There is continued activity in the buying of Merchant sizes of Pipe, and the mills are entering a heavy tonnage for forward delivery. The National Tube Company, Youngstown Sheet & Tube Company, Spang, Chalfant & Co., and La Belle Iron Works are all congested with work and are entering orders only for shipment when present tonnage on their books has been cleaned up. A new and higher schedule of freight rates on Pipe will become effective on June 1, and prices on contracts for shipment after that date will be revised to meet the higher freight rates. Discounts on Steel Pipe are as follows:

Merchant Pipe.	Jobbers, carloads.	
	Steel.	
	Black.	Galv.
1/4 to 1/2 in.....	.65	.49
3/8 in.....	.67	.53
1/2 in.....	.69	.57
3/4 to 6 in.....	.73	.63
7 to 12 in.....	.70	.55
Extra strong, plain ends:		
1/4 to 3/8 in.....	.58	.46
1/2 to 4 in.....	.65	.53
4 1/2 to 8 in.....	.61	.49
Double extra strong, plain ends:		
1/2 to 8 in.....	.54	.43

All above discounts are subject to 1 point on the base and 5 per cent. on the net.

Official discounts on Iron Pipe, which are shaded one-half point or more to the large trade, are as follows, f.o.b. Pittsburgh:

Standard Genuine Iron Pipe.	Black.	
	Galv.	
	Black.	Galv.
3/4 to 6 in.....	.67	.57
1/2 in.....	.62	.50
3/8 in.....	.60	.42
1/4 and 1/2 in.....	.58	.42
7 to 12 in.....	.62	.47
Extra Heavy Iron Pipe, Plain Ends.		
1/4, 1/2 and 3/8 in.....	.62	.40
1/2 to 4 in.....	.59	.47
4 1/2 to 8 in.....	.55	.42

Merchant Steel.—The active buying in Steel Bars by the implement makers, amounting to upward of 125,000 tons, is being reflected in other grades of Steel, such as Machinery, Tire Steel and Railroad Spring, some good sized contracts for which have recently been placed for delivery over the next 12 months. Prices are firm, and we quote: Smooth Finished Machinery Steel, 1.85c. to 2c., depending on quality; Flat Sleigh Shoe, 1.65c. to 1.75c.; Cutter Shoe, 2.15c. to

2.20c.; Toe Calk Steel, 2.10c. to 2.15c.; Railroad Spring Steel, 1.75c. to 1.80c.; Crucible Tool Steel, 6c. to 8c., for ordinary grades, and 10c. and upward for special grades. We quote Cold Rolled Shafting at 50 per cent. off in carloads, and 45 per cent. in less than carloads, delivered in base territory.

Boiler Tubes.—We continue to note a very active demand for both Locomotive and Merchant Tubes, especially for the former, and a large tonnage is being entered by the mills for Steel Tubes, 2 $\frac{1}{4}$ to 5 in., at 65 and 5 per cent. off the list. None of the mills is in position to make deliveries on Boiler Tubes inside of two to three months. Official discounts on Boiler Tubes for forward delivery are as follows:

Boiler Tubes.		Iron.	Steel.
1 to 1 $\frac{1}{2}$ in.	.....	41	47
1 $\frac{1}{2}$ to 2 $\frac{1}{4}$ in.	.....	42	59
2 $\frac{1}{4}$ in.	.....	47	61
2 $\frac{1}{2}$ to 5 in.	.....	52	65
6 to 13 in.	.....	42	59
2 $\frac{1}{2}$ in. and smaller, over 18 ft. long, 10 per cent. net extra.			
2 $\frac{1}{2}$ in. and larger, over 22 ft. long, 10 per cent. net extra.			

Coke.—There is still an excessive supply of Furnace and Foundry Coke for prompt shipment and low prices are being made. Sales of strictly Connellsville Furnace Coke loaded on cars, and which had to be moved, have been made as low as \$2 a ton at oven. Connellsville 72-hr. Foundry Coke for prompt delivery has sold at \$3 a ton at oven. The output continues abnormally heavy, the Upper and Lower Connellsville regions having made last week 416,971 tons.

Iron and Steel Scrap.—In the past week the Scrap market has developed a distinctly stronger tone, especially in Steel, and prices are somewhat better. This improvement is probably due to the scarcity and high prices ruling for Pig Iron, which sooner or later were certain to be reflected in Melting Scrap. The Baltimore & Ohio Railroad is out with its list, on which bids are to be in at Baltimore on June 1. The list includes 3268 tons of Re-rolling Rails, about 1500 tons of Wrought Scrap, 1000 tons of Cast Iron Scrap and about 500 tons of miscellaneous Steel Scrap. The lists of the Pittsburgh & Lake Erie and also the American Locomotive Company are out, bids on which are to be in on May 29. Prices on some lines of Scrap, particularly Steel, have advanced in the past week from 25 cents to 50 cents a ton. Dealers now ask higher figures and are quoting about as follows: Heavy Steel Scrap, \$18.50 to \$18.75, for Pittsburgh, Stenbenville and Sharon delivery, prices depending on quality; No. 1 Railroad Wrought Scrap, \$18.75 to \$19, and No. 2, \$18.25 to \$18.50; Bundled Sheet Scrap, \$16.50; No. 1 Busheling Scrap, \$18 to \$18.25; No. 2 Busheling Scrap, \$15 to \$15.25; Old Steel Rails, short pieces, for Open Hearth purposes, \$18.50 to \$19; Old Steel Rails, re-rollers, \$19; Low Phosphorus Melting Stock, \$22.50 to \$23; Cast Iron Borings, \$14.25 to \$14.50; Stove Plate, \$16.50 to \$16.75; Old Car Wheels, \$26 to \$26.25; Steel Axles, \$21.25 to \$21.75; Grate Bars, \$16.25 to \$16.50; No. 1 Cast Scrap, \$22; all above prices are per gross ton f.o.b. Pittsburgh. We note sales of Bundle Sheet Scrap at \$16.50, Engine Cast Scrap at \$22, and about 400 tons of Cast Scrap at \$21.90 to \$22, Pittsburgh.

Birmingham.

BIRMINGHAM, ALA., May 26, 1907.

Pig Iron.—Sales have been very light, owing to the reluctance of furnaces to take on additional business for delivery this year. Inquiries for the entire last half continue numerous, and it looks very much as if conditions this fall will be worse than last. A few small orders for the first quarter of 1908 have been placed at prices ranging from \$18.25 to \$18.50. Furnaces as a rule are not soliciting this business as yet, nor are the more conservative buyers inclined to make contracts ahead in view of present unsettled conditions. There has been little change in prices, quotations ranging about as follows: Spot shipment, \$22.50 to \$23; June, \$22 to \$22.50; third quarter, \$21 to \$21.50, and last quarter, \$20. The car situation continues satisfactory and Iron is being moved from the district as rapidly as made. No accumulations except a small quantity of off grades are to be seen on any of the furnace yards in the district.

Cast Iron Pipe.—The constant inquiry for Water Pipe in small lots is aggregating a large tonnage, and the manufacturers here express themselves as being entirely satisfied with existing conditions. While it may be true that fewer large lettings have been advertised this year than heretofore, it is also a fact that more deals have been closed privately than was formerly customary, and the number of small orders has exceeded anything in the history of the business. The foundries in this district are sold for several months ahead, and prices to-day are firmer than at any previous time this year. Quotations are approximately as follows

on Water Pipe, per net ton: 4 to 6 in., \$36; 8 to 12 in., \$34; over 12-in., average, \$31, with Gas Pipe \$1 extra per ton.

A new list price on Cast Iron Soil Pipe and Fittings has been adopted by the manufacturers throughout the country and was placed in effect on May 24. The demand for this commodity at the present time is such that, with the unfavorable labor situation, it is only with the greatest difficulty that the foundries in this district are enabled to fill their orders.

Old Material.—Considerable improvement is reported in the Scrap market this week. The demand for Heavy Cast, which all along has absorbed the supply, is now understood to be most urgent. There is also more inquiry for Wrought than for some time, and while the sales thus far have been small, the outlook is better than for several months. Dealers' quotations are approximately as follows per gross ton, f.o.b. cars here:

Old Iron Rails.....	\$22.00 to \$22.50
Old Iron Axles.....	18.50 to 19.00
Old Steel Axles.....	16.50 to 17.00
Old Car Wheels.....	20.50 to 21.00
No. 1 Railroad Wrought.....	18.50 to 19.00
No. 2 Railroad Wrought.....	13.00 to 13.50
No. 1 Country Wrought.....	13.00 to 13.50
No. 2 Country Wrought.....	12.00 to 12.50
Wrought Pipe and Flues.....	13.50 to 14.00
Railroad Malleable.....	13.50 to 14.00
No. 1 Steel.....	14.00 to 14.50
No. 1 Machinery Cast.....	16.50 to 17.00
Stove Plate and Light Cast.....	12.50 to 13.00
Cast Borings.....	8.50 to 9.00

Cincinnati.

FIFTH AND MAIN STS., May 29, 1907.—(By Telegraph.)

Pig Iron.—Quite a lull has developed. General conditions apparently are as strong as ever, but inquiry is light and actual transactions are small. There is quite a diversity of opinion as to what extent consumers are covered for the remainder of the year. At the same time considerable speculation is being indulged in as to whether the tonnage available will be sufficient to fully meet the requirements of those belated buyers, who may deem it advisable to pursue a waiting policy to the limit. The largest inquiry reported is for 1000 tons of Foundry grades, delivery covering October to March. The demand for spot Iron has been light, with, perhaps, enough cars on track or in transit to meet all demands. Sales covering the first part of next year are being recorded daily, but the quantities, comparatively, have been rather limited. Quotations for this delivery are from \$18 to \$18.50 for No. 2, Birmingham, the latter figure, perhaps, representing more nearly the market price. Southern producers are reported as showing little interest in the situation beyond the close of the present year and are apparently making no efforts to hurry the sale of their product for this period. The lower grades are reported in light demand, with an abundant supply available. Freight rates from Hanging Rock District to Cincinnati are \$1.15, and from Birmingham, \$3.25. We quote for second quarter delivery, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$24.75 to \$25.25
Southern Coke, No. 2.....	24.25 to 24.75
Southern Coke, No. 3.....	23.75 to 24.25
Southern Coke, No. 4.....	22.75 to 23.25
Southern Coke, No. 1 Soft.....	24.75 to 25.25
Southern Coke, No. 2 Soft.....	24.25 to 24.75
Southern Coke, Gray Forge.....	21.75 to 22.25
Southern Coke, Mottled.....	20.75 to 21.25
Ohio Silvery, 8 per cent Silicon.....	30.65 to 31.15
Lake Superior Coke, No. 1.....	24.65 to 25.15
Lake Superior Coke, No. 2.....	24.15 to 24.65
Lake Superior Coke, No. 3.....	23.65 to 24.15

Car Wheel Irons.

Standard Southern Car Wheel.....	\$29.00 to \$29.50
Lake Superior Car Wheel.....	27.50 to 28.00

Coke.—This market has been unusually active and indicates a heavy tonnage in the renewal of contracts for next year's business. Prices are somewhat irregular, showing considerable spread. We quote the best brands of Connellsville and Virginia Foundry from \$3 to \$3.35 f.o.b., ovens.

Finished Iron and Steel.—The situation is practically unchanged, with new business coming forward in a satisfactory manner. Deliveries are lengthening, the mills being crowded with work. Prices are strong but unchanged. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.93c., with half extras; smaller lots from store, 2c., with full extras. Steel Bars, carload lots, 1.73c., half extras, smaller lots from store, 1.95c., with full extras. Base Angles, carload lots, 1.83c. Beams and Channels, carload lots, 1.83c., base. Plates, $\frac{1}{4}$ -in. and heavier, carload lots, 1.83c., base, and smaller lots from store, 2.25c. Sheets, No. 16, carload lots, 2.05c., and smaller lots from store, 2.60c.; No. 14, carload lots, 1.95c., and smaller lots from stock, 2.50c. Steel Tire, 1 x $\frac{1}{4}$ in. or heavier, 1.93c. in carload lots.

Old Material.—The demand for Scrap is a little quieter, and the tonnage handled is rather light. Prices so far as

obtainable are unchanged. We quote dealers' prices, f.o.b. Cincinnati, about as follows:

No. 1 R. R. Wrought, net ton	\$16.50 to \$17.00
Cast Borings, net ton	9.00 to 9.50
Steel Turnings, net ton	12.00 to 12.50
No. 1 Cast Scrap, net ton	17.50 to 18.00
Old Iron Axles, net ton	25.50 to 26.00
Old Iron Rails, gross ton	24.00 to 25.00
Old Steel Rails, long, gross ton	17.50 to 18.00
Relaying Rails, 56 lb. and up, gross ton	28.25 to 29.25
Old Car Wheels, gross ton	24.00 to 24.50
Low Phosphorus Scrap, gross ton	19.50 to 20.00

Cleveland.

CLEVELAND, OHIO, May 28, 1907.

Iron Ore.—The movement from the upper lake ports has been heavier the past week, and Ore is now coming down in some satisfactory shape, although the weather conditions have been somewhat unfavorable. Ore boats are spending more time at the upper lake ports than they did last year, and the delay in loading boats, which was caused by the cold weather, has made quite a difference in the supply of tonnage. Reports received the past day or two indicate that the Ore is now coming forward in better shape from the mines. Considerable time was lost by the Ore fleet as a result of the storm that swept over the lakes early this week. Many boats were forced to seek shelter from the gale and others were unable to leave their ports. Some damage was done to shipping, and many boats were delayed 24 hr. Vesselmen are keeping up pretty well on their contracts, and shippers have plenty of tonnage, so that chartering is light. Ore shipments up to June 1 will probably show a small falling off, compared with last year. As a result the 6,000,000-ton mark per month will have to be reached in June, July, August and September, and the shipments from October 1 till the close of navigation will have to be heavier than last year in order to move 40,000,000 tons. Complaints of a scarcity of cars have about ceased. A representative of one of the local shippers of Ore who has visited a number of the furnaces in Ohio and Kentucky reports that the majority of the furnaces are running in good shape and that several of them will need more Ore than they anticipated. To cover for their increased needs it is expected that there will be quite an active buying movement in Ore along about August. Prices are unchanged, being as follows at Lake Erie docks, per gross ton: Old Range Bessemer, \$5; Mesaba Bessemer, \$4.75; Old Range Non-Bessemer, \$4.25; Mesaba Non-Bessemer, \$4; Siliceous Bessemer, \$2.75; Siliceous Non-Bessemer, \$2.35 to \$2.60.

Pig Iron.—There have been a number of inquiries for Foundry Iron for the first half of 1908 delivery, and two furnaces report the sale of quite a large tonnage in the aggregate for that delivery at \$22, at furnace, for No. 2 Foundry. There are still plenty of inquiries for last half delivery, but only a small tonnage was sold, the furnaces being practically all out of the market for the rest of the year and keeping what little Iron they may have left for spot sales. The only sales reported for the last half were made at \$24.75, Cleveland, for No. 2. The market continues very strong, although no further advance in price is noted. Where Foundry Iron can be had \$24, Valley furnace, seems to be the established price at present for the last half delivery. A few sales of No. 2 Foundry for spot shipment are reported in small lots at \$25 and \$26, at furnace. An occasional sale of British Iron is being made at \$26, Cleveland, for No. 3 Middlesbrough, for quick delivery. No sales of Southern Iron are reported, local dealers being out of the market for the balance of the year. Following the large sale of Malleable Bessemer Pig Iron for the first half of 1908 reported last week there have been no further inquiries for Malleable for next year's delivery, and the furnaces are well satisfied not to make many sales that far ahead. Some of the furnaces making Foundry Iron are also not anxious to make sales at the present time for next year's delivery. The Basic Iron situation remains firm, and there are still numerous inquiries for the last half delivery. No sales are reported, however. The Basic interests are so well sold up for the balance of the year that they are holding the little Iron they have left for the last quarter to sell for spot delivery at higher prices. Quotations for the last half of 1907, f.o.b. Cleveland, are as follows:

Bessemer	\$23.90
Northern Foundry, No. 1	\$24.50 to 25.00
Northern Foundry, No. 2	24.00 to 24.50
Northern Foundry, No. 3	23.50 to 24.00
Gray Forge	23.00

Coke.—The market is more active and prices are firmer, and local dealers report the sales of a heavy tonnage during the past week of both Foundry and Furnace Coke for delivery the last half of 1907 and the first half of 1908. Dealers are asking \$3.25 to \$3.40, at oven, for Foundry Coke, and \$2.80 to \$2.90, at oven, for Furnace Coke. Foundry Coke for spot shipment is quoted at \$3.15 to \$3.25, a few sales being reported at those prices.

Finished Iron and Steel.—Orders for a heavy tonnage of Steel Bars have been placed in the local market by the implement makers the past week, and it is believed that a large majority of these consumers have now covered for their next year's requirements. Many other manufacturing interests that have been holding off on their Steel Bar purchases for the last half, apparently waiting to see if the implement makers would get any concessions, have also entered the market and covered for their requirements, making contracts at the established price. The orders placed indicate confidence in future business conditions, the majority of the purchasers placing orders for heavier tonnage than their previous orders. One leading mill has taken Steel Bar tonnage aggregating between 20,000 and 30,000 tons during the week, and reports a heavier week's business than it has had for several months. Good sized tonnages were booked by other mills. There is a heavy demand for Steel Bars for quick delivery, and mills are asking as high as 1.90c., Pittsburgh, for small lots for quick shipment. For future delivery Steel Bars are quoted at 1.70c., Cleveland, half extras, for carload lots. Iron Bars are in good demand, and the most of the sales are being made at 1.80c., Cleveland, for carload lots, with deliveries promised in two or three months, although some sales are being made at 1.85c., Cleveland. New business continues good in Plates, Billets and Structural Material. Billets are still scarce. One mill reports additional sales of quite a heavy tonnage for delivery within the next two or three months at \$30, at mill, for Bessemer Billets, and at \$32, at mill, for Open Hearth Billets. The Plate situation seems a little easier. Both Plates and Sheets are in fair demand for quick delivery, and for delivery in from two to four weeks Pittsburgh mills are asking a premium of \$2 to \$6 for Plates. A premium of \$2 is asked for Sheets for delivery in two to four weeks. The Structural situation is very satisfactory. One mill reports the sale of 2000 tons for last half delivery to cover general contracts, and specifications are expected soon for 1000 tons for a new building in Toledo, Ohio. There are several inquiries for Traction Rails in the local market, ranging from 500 to 3000 tons, and some of the deals are expected to be closed soon. Boiler Tubes are scarce and hard to get on specifications. The freight rate on Iron and Steel from Pittsburgh to Cleveland will be advanced on June 1 from 9½c. to 10c. for carload lots, and from 11c. to 13c. for less than carload lots. Warehouse business continues good, with prices unchanged. Steel Bars are quoted at 1.95c. out of stock, and Iron Bars at 2c. Warehouse prices on Sheets are as follows: Blue Annealed, No. 10, 2.30c.; No. 28, One Pass Cold Rolled, 3.05c.; No. 28 Galvanized, 4.15c. The stock price on Boiler Tubes, 2½ to 5 in., is 64 per cent. discount, and on Black Merchant Iron Pipe, base sizes, 67 per cent. discount.

Old Material.—The market is quiet and dull. Consumers are apparently waiting for lower prices and are making but few inquiries. Dealers are short on about everything but Steel Scrap. The market stiffened after they made selling contracts and they say that they cannot buy now at prices that will enable them to make anything, and they are holding off in the hope of covering at lower prices. Cast Scrap and Borings are strong, but all prices remain the same as a week ago. The only railroad offering of importance this week is a list of about 4000 tons by the Baltimore & Ohio. Dealers' prices to the trade, per gross ton, f.o.b. Cleveland, are as follows:

Old Steel Rails	\$16.75 to \$17.00
Old Iron Rails	24.00 to 25.00
Steel Car Axles	22.50 to 23.00
Old Car Wheels	23.00 to 23.50
Relaying Rails, 50 lb. and over	29.00 to 31.00
Relaying Rails, under 50 lb.	31.00 to 32.50
Heavy Melting Steel	16.50 to 17.00
Railroad Malleable	19.00 to 19.50
Agricultural Malleable	15.50
Light Bundled Sheet Scrap	15.50 to 16.50
Bundled Tin Scrap	15.00 to 17.00

The following quotations are per net ton, f.o.b. Cleveland:

Iron Car Axles	\$26.00 to \$27.00
Cast Borings	10.50 to 11.00
Iron and Steel Turnings and Drillings	12.50 to 13.00
No. 1 Busheling	14.50 to 15.00
No. 1 Railroad Wrought	16.50 to 17.00
No. 1 Cast	18.50 to 19.00
Stove Plate	15.00 to 15.50

The Next East River Bridge.—Since it requires about four years for a new bridge project in New York City to take shape in specifications, the fact that the Department of Bridges now has under consideration preliminary plans for a new East River bridge will cause no stir in steel circles. However, it indicates how tremendous is the pressure upon existing transportation facilities and how forehanded the city government must be in planning relief that engineers are now at work on the preliminaries of a structure that shall be close enough to the Brooklyn Bridge to give an effective solution of the problem of travel between Manhattan and Brooklyn boroughs.

New York.

NEW YORK, May 29, 1907.

Pig Iron.—Outside of one lot of about 4500 tons of Foundry Iron for a railroad supply plant, no large transactions are reported. The market for Foundry Iron remains firm. In Basic Iron there have been some moderate lots sold to works in this district. We quote spot Northern Iron \$25.50 to \$26 for No. 1 Foundry, and \$24.50 to \$24.75 for No. 2 Foundry. For the second quarter we quote \$25 to \$25.25 for No. 1 Foundry, \$23.50 to \$24.25 for No. 2 Foundry and \$22.75 to \$23 for No. 2 Plain. No. 2 Southern Foundry is nominally quoted \$26.25 to \$26.50 for spot and \$23.25 to \$23.75 for the third quarter. Middlesbrough is held at \$23 to \$23.50, ex-ship.

Steel Rails.—Buying of Rails for 1908 delivery continues at a good rate. In the past week the Lackawanna Steel Company has closed 35,000 tons for the Northern Pacific, deliveries in 1907 and 1908, and the Tennessee Coal, Iron & Railroad Company has sold 30,000 tons of Open Hearth Rails to the Southern Railway for delivery in 1908. The Southern Railway is negotiating for 10,000 tons of Bessemer Rails for June and July of this year, and will want a further tonnage for 1907. A considerable sale of Bessemer Rails has been made for 1907 delivery in Canada. Among 1908 inquiries pending are those of the Atchison system for 30,000 tons and of the Chesapeake & Ohio for 11,000 tons. The Harriman inquiry for 30,000 tons of Bessemer Rails, to be delivered late in 1908, has been withdrawn.

Structural Material.—It is estimated that fully 150,000 tons is called for by Structural contracts let in May, all sections of the country contributing and the tonnage being largely for buildings, though railroad bridge work is represented to an extent. The San Francisco situation is just now most unfavorable for the prosecution of rebuilding operations. Labor union demands have brought operations in some lines almost to a standstill and banks have been led by this development to hold on to their funds more tightly, so that the promoters of new building enterprises are forced for the time being to hold their hands. The prospect that the labor union issue may have to be threshed out soon is far from encouraging to builders. In New York City the Lawyers' Title Building, 2400 tons, was taken last week by the Fuller Construction Company, and an apartment studio building at Seventy-seventh street and Columbus avenue, 1600 tons, by Lewinson & Co. The Chicago & Northwestern Railroad bridge at Clinton, Iowa, 3500 tons, was taken by the Wisconsin Bridge Company. Among American Bridge Company work just closed are 2600 tons for a commercial building in Philadelphia, for which Parvin & Co. have the general contract; 1400 tons of bridges for the Atlantic Coast Line, 1300 tons for Carnegie Steel Company new construction, 800 tons more for Gary, Ind., construction, and 500 tons for a cotton runway at Memphis, Tenn. In New York City the Bridge Department has plans under way for another East River bridge paralleling the Brooklyn Bridge, a development less of immediate interest to the Steel trade than of significance in connection with the rapid increase in the demand for transportation facilities in this city. The Structural mills are running under fairly full specifications and, on the other hand, deliveries are better. We continue to quote on mill shipments, tidewater deliveries, as follows: Beams, Channels, Angles and Zees, 1.84½¢; Tees, 1.89½¢; Bulb Angles and Deck Beams, 1.99½¢. On Beams 18 to 24 in. and Angles over 6 in. the extra is 0.10¢. Sales are made out of stock of material cut to length at 2¼¢. to 2½¢.

Bars.—The Bar Iron situation continues fairly strong, with orders placed for good quantities at a minimum of 1.84½¢., tidewater. Steel Bars are in continued demand, with deliveries as much belated as heretofore. Quotations range from 1.60¢., Pittsburgh, or 1.74½¢., tidewater, on long delivery, to 1.84½¢., tidewater, or higher on new orders for early delivery. After June 1 freight rates from Pittsburgh to tidewater, New York, will be 16¢. per 100 lb., or an advance of 1½¢.

Plates.—Local orders consist mainly of small lots for quick shipment, on which better prices are being obtained by Eastern mills than are quoted on long deliveries by Western companies. While little is being done in contracts for future delivery, an occasional order is received for a fair quantity. Quotations for tidewater delivery are as follows: Sheared Tank Plates, 1.84½¢. to 1.94½¢.; Flange Plates, 1.94½¢. to 2.04½¢.; Marine Plates, 2.24½¢. to 2.34½¢.; Fire Box Plates, 2.75¢. to 3.50¢., according to specifications.

Cast Iron Pipe.—The order for 3100 tons placed by the City of New York May 22 was taken by contractors who will purchase the Pipe from manufacturers. The demand for small lots is fair, but no large work is in sight at present. The foundries are so well filled with business that prices are exceedingly firm. Quotations are continued on the basis of \$37 to \$38 per net ton, tidewater, for carload lots of 6-in.

Old Material.—The continued cool weather and the short supply of Scrap combine to make the market strong. The

cool weather enables the mills and foundries to run full force, turning out a maximum of product, while everything offered by railroad companies is easily absorbed, and most classes of Old Material are scarce. The demand for Heavy Melting Steel Scrap is especially vigorous, as numerous dealers are eagerly searching for supplies to fill contracts taken some time ago. Cast Scrap has not been reduced in price, but the demand is not so pressing as it was. Stove Plate, however, is in better demand than Heavy Cast and prices are stronger. Old Iron Rails are in fair request, while Old Car Wheels are in sharp demand and few are to be had. Quotations per gross ton, f.o.b. New York, are as follows:

Old Girder and T Rails for Melting.....	\$16.00 to \$16.50
Heavy Melting Steel Scrap.....	16.00 to 16.50
Old Steel Rails, rerolling lengths.....	18.75 to 19.50
Relaying Rails.....	27.50 to 28.00
Old Iron Rails.....	24.00 to 24.50
Standard Hammered Iron Car Axles.....	30.00 to 30.50
Old Steel Car Axles.....	20.50 to 21.00
No. 1 Railroad Wrought.....	19.50 to 20.00
Iron Track Scrap.....	17.50 to 18.00
No. 1 Yard Wrought, long.....	17.50 to 18.00
No. 1 Yard Wrought, short.....	17.00 to 17.50
Wrought Pipe.....	14.50 to 15.00
Light Iron.....	11.00 to 11.50
Cast Borings.....	12.50 to 13.00
Wrought Turnings.....	14.50 to 15.00
Old Car Wheels.....	23.00 to 23.50
No. 1 Heavy Cast, broken up.....	19.00 to 20.00
Stove Plate.....	16.50 to 17.00
Grate Bars.....	14.00 to 14.50
Malleable Cast.....	20.00 to 20.50

Metal Market.

NEW YORK, May 29, 1907.

Pig Tin.—Prices are easier, owing to a better supply of metal and the absence of buying demand. The trend has been downward, and sharp declines have been reached on some days. Spot metal was sold May 23 at 43.50¢., the same price being obtained on the following day. Free offerings on the New York Metal Exchange on May 27 brought the price to 42.75¢., and on May 28 sales were made at 42¢. Today Tin is higher at 42.50¢., on account of the advance in London, the price closing there at £189 15s. for spot and £185 15s. for futures. The total arrivals so far this month amount to 2427 tons, but of this nearly 1000 tons is down the bay, on account of the dock strike. A large proportion of the metal still on shipboard in the harbor has already been sold, the leading consuming interest being credited with having about 700 tons. The demand is so light that the scant supply now in store and on dock is sufficient for all requirements. The dock strike is still hampering deliveries, but the most of the metal is now being shipped on mail steamers, which carry sufficiently large crews to unload these vessels promptly. The Celtic, which docked Monday, is now discharging the last of her cargo.

Copper.—The Copper market is decidedly unsettled. Free offerings of Electrolytic at 23.50¢. have found no buyers, and much June delivery metal contracted for months ago has been offered for resale by consumers. It is believed that even lower prices would be accepted from European consumers. It looks now as though there was enough May and June Copper left over to last for some time in July, or until a time when the market will have become more settled, even though at lower figures. European melters have not overbought as much as American consumers, consequently they must needs come in the market for some of their July Copper. Lake producers complain bitterly of the situation, and from more than one quarter the statement is heard that conditions in the Copper trade have never been quite the same as they are now. There has been no inquiry for round lots of Lake for over a month, and consequently prices are nominal. In the absence of business by which to gauge prices for Lake, a figure must be named covering a wide range indicating the views of buyers and sellers, the former being largely influenced by the prices of Electrolytic. We quote Lake at 24.25¢. to 25¢.; Electrolytic, 23.50¢. to 24¢., and Casting Grades, 22.25¢. to 23¢. The London market was almost demoralized Tuesday, but closes stronger today at £99 15s. for spot and £97 for futures. Best Selected is also lower at £109, but is still at a considerable variance with the price of Standard. The exports are light, amounting to but 7871 tons so far this month, while the imports are over 4800 tons, not including Ores or Matte. What little Copper is being sold now, and there is always some business, is taken from jobbers who report a good trade, owing to the fact that many consumers, being unwilling to make commitments for large lots, are buying from hand to mouth and urging deliveries. Mention is made of some Electrolytic sold last week at something over 24¢., but of course no one expects to pay such a price to-day for round lots. The optimistic reports in the financial columns of some of the reputable daily papers are so far at variance with actual conditions as to be quite humorous.

Lead.—The rapidity with which the American Smelting & Refining Company is catching up with its orders, and the short time elapsing between the booking of orders and shipments of Metal, lead to the belief that its price will be

shortly reduced. Outside business is dull, but prices are unchanged, at 6c., New York, and 5.92½c., St. Louis. The London market is higher, at £20.

Spelter.—Trade is dull, but prices show no marked recessions from those of a week ago. Some sales have been made at 6.45c., New York, which is equivalent to 6.30c., St. Louis.

Antimony.—The large stocks of Antimony and Antimonial Lead continue to have a depressing effect on the market. Buyers have lost confidence in the market, as there is no regularity in the matter of price. Hallett's can be had at 17c. to 18c., Cookson's at 19.50c. to 20.50c., and outside brands as low as 16.50c.

Ferroalloys.—One of the larger orders in the market for Ferrosilicon—namely, that of the Carnegie Company—has been closed. The price for large lots for future delivery is unchanged, at \$104 for 50 per cent. While spot stocks continue to command a premium, it is not so high as a fortnight ago, sales for August delivery having been made at \$106. Ferromanganese continues exceedingly dull, prompt shipments being obtainable at \$67 to \$69 and future deliveries at \$64 to \$66.

Tin Plate.—There is less inquiry for foreign Plates, which leads to the belief that domestic makers have been taking some of the business that might be inclined to go abroad. Prices are unchanged at \$3.90, f.o.b. Pittsburgh, and \$4.09, f.o.b. New York, for 100 lb. IC Coke Plates.

Old Metals.—There is but little demand, and the business ruling is subject to sharp competition. Dealers' selling prices, which are largely nominal but lower, are as follows:

	Cents.	
Copper, Heavy Cut and Crucible.....	21.75	to 22.00
Copper, Heavy and Wire.....	21.50	to 21.75
Copper, Light and Bottoms.....	19.50	to 20.00
Brass, Heavy.....	15.25	to 15.50
Brass, Light.....	12.25	to 12.50
Heavy Machine Composition.....	19.00	to 19.25
Clean Brass Turnings.....	13.25	to 13.75
Composition Turnings.....	16.50	to 16.75
Lead, Heavy.....	5.40	to 5.50
Tea Lead.....	5.10	to 5.20
Zinc Scrap.....		5.25

Iron and Industrial Stocks.

NEW YORK, May 29, 1907.

The stock market has been under continuous pressure most of the time since last week's report and prices have shown in some cases a sharp decline. Liquidation has been heavy. The lowest prices were realized on Monday and Tuesday. On active stocks the following shows the low point touched on one and in some instances both days: United States Steel common 31½, preferred 96; Car & Foundry common 34½, preferred 98½; Locomotive common 55½, preferred 105½; Steel Foundries common 6, preferred 35; Pressed Steel common 30½, preferred 89; Railway Spring common 39¼; Republic common 23¼, preferred 82½; Sloss-Sheffield common 51¼, preferred 97¼; Tennessee Coal 138; Cast Iron Pipe common 31, preferred 82; Can common 5½, preferred 53½. To-day some recovery took place, and last transactions up to 1.30 p.m. are reported at the following prices: United States Steel common 32¾, preferred 97½; Car & Foundry common 36½, preferred 98½; Locomotive common 56½, preferred 105; Steel Foundries common 6, preferred 35; Colorado Fuel 29; Pressed Steel common 31, preferred 90; Railway Spring common 39¼; Republic common 24, preferred 84; Sloss-Sheffield common 56; Tennessee Coal 138; Cast Iron Pipe common 31½, preferred 81; Can common 5¼, preferred 53.

The Railway Steel Spring Company has declared the regular quarterly dividend of 1¼ per cent. on the preferred stock, payable June 20.

The Canal Board of the State of New York has approved plans for work on the 1000-ton barge canal, involving a total expenditure of about \$7,750,000. The State Superintendent of Public Works will advertise for proposals in the next 10 days, and the contracts, when let, will be the first to have been awarded under the present State administration. The contracts approved were No. 12, covering excavation for the new canal from Onelda Lake westward, 42 miles; No. 14, providing for construction of locks and dams in the Mohawk River between Amsterdam and Little Falls, and No. 35, providing for the excavation of the Oswego Canal near Fulton.

The Remington Typewriter Company, Ilion, N. Y., has placed contracts for an important addition to its factory. Two new buildings will be constructed on land adjoining the Remington plant, which recently was acquired, and will enable the company to increase its capacity nearly one-half.

Mexican Railroad and Business Notes

Financial Stress in Yucatan.

DURANGO, May 22, 1907.—The terrestrial paradise is yet to be discovered. No matter how favored it may be by nature, every country has its drawbacks, and Mexico is no exception to the rule. If military terms might appropriately be applied to the present situation in this country, so lavishly endowed in some respects, it could not be better described, particularly with respect to the northern tier of States, than by saying that General Drouth has taken possession of the field and that his devastating legions are leaving wreck and ruin in their train. For more than half a year scarcely a drop of refreshing rain has fallen in the State of Durango; from other States also comes the cry of disaster and misfortune caused by the long continued drouth and its attendant evils. From the State of Yucatan, for example, which counts among its inhabitants probably a greater number of very rich men than any other State in the Mexican union, late reports bring news of a financial situation of such stringency as to be almost panicky. "Three commercial houses failed for over \$6,000,000 during April," says this report, giving as the causes of the embarrassments "long continued drouth, losses by fire and tight local money markets." The cultivation of henequen, which is sold to the United States, is the State's chief source of wealth. Prices have fallen of late, to the great loss of the *hacendados*, while the dry weather has caused the destruction of a large number of growing plants, fires having broken out on the plantations. The commercial houses engaged in the henequen trade are situated principally in Progreso and Merida, the latter being the capital of the State. The peninsula of Yucatan and Campeche is in the extreme southeast of Mexico, yet in respect to atmospherical conditions at this time of the year it appears to be suffering equally with the north.

The Railroads Busy.

Each recently published report of the chief railroad systems shows increased earnings; indeed, the transportation companies were never so prosperous. In the six months ending December 31, of last year, the National Railway Company showed a surplus of nearly \$1,000,000, United States currency, and other systems give evidence of the increased activity in this important line of business. In the matter of projected new lines, as well as in actual construction now under way, there has probably been no time in the railroad history of the country when so much important work loomed up ahead. The Mexican Central, the Kansas City, Mexico & Orient, the Southern Pacific and the Pan-American are busy grading or laying rails in sections hitherto without the great civilizing agency of railroad communication, and rumors are again rife that it will not be long before a move will be made upon the construction of at least a portion of the many times heralded road between the city of Durango and Mazatlan. The following notes refer more specifically to the operations of the various companies in this field of activity:

The Saucedo Coal Company, with \$1,000,000 capital, has been formed to work certain coal lands in the Coahuila field. The following individuals are named as stockholders: Charles Schreiner, Otto Koehler, Otto Wharmund, James L. Slayden of San Antonio, Charles Stadler of New York, Pablo Martinez del Rio of Mexico City, and Andrés Garza Galán of Monterey.

The Mexican Central continues to extend the use of crude petroleum instead of coal in its locomotives. Oil burning engines will soon be in service upon the Guadalupe division. Incidentally it may be mentioned that a report is published to the effect that an oil "strike" has been made at Ebano.

A large electric power plant is projected at a point near Tuxpan, in the State of Jalisco, a concession for the necessary water power privileges having been granted to Señor Carlos F. de Lendero, manager of the Bank of Hidalgo, in Pachuca.

J. J. D.

PERSONAL.

F. G. Bush, formerly of the National Malleable Castings Company, Sharon, Pa., has been elected treasurer and also a director of the Solid Steel Tool & Forge Company, Brackenridge, Pa.

I. H. Pratt, European representative of the Ajax Mfg. Company, Cleveland, Ohio, who has been spending several months in Cleveland, returned to London last week to look after the interests of his company.

Anton J. Berger, for a number of years connected with the Aermotor Company, Chicago, as purchasing agent, has resigned to accept a position with the American Spiral Pipe Works, Chicago.

Frank W. Trabold, for some years with J. H. Williams & Co., manufacturers of drop forgings, Brooklyn, N. Y., has resigned to assume the position of general manager of the Cambria Forge Company, Johnstown, Pa.

David W. Ross, general purchasing agent of the Isthmian Canal Commission, has tendered his resignation, to take effect upon the appointment of his successor. Mr. Ross is to become president of the corporate interests of Charles M. and Herbert H. Hewitt, who control the Magnus Metal Company, Featherstone Foundry & Machine Company and Hewitt Mfg. Company, Chicago; United and Globe rubber manufacturing companies, Trenton, N. J., and the Hewitt Rubber Company, Buffalo, N. Y.

Charles W. Goodyear of Buffalo has been elected president of the Buffalo & Susquehanna Railroad, succeeding his brother, the late Frank H. Goodyear, in that position. A. C. Goodyear, purchasing agent of the company, and a son of Charles W. Goodyear, has been elected first vice-president.

Roy Welsh has been made assistant to Charles S. Robinson, vice-president and general manager of the Youngstown Sheet & Tube Company, Youngstown, Ohio.

G. P. Armstrong is now connected with the sales department of the F. H. Brown Machinery Company, Park Building, Pittsburgh.

William N. Neckerman of Pittsburgh has been appointed chief engineer of the plant of the Youngstown Sheet & Tube Company, Youngstown, Ohio, to succeed A. L. Hammerberg, resigned.

Charles I. Gibson, formerly assistant superintendent of the Vandergrift Works of the American Sheet & Tin Plate Company, has been appointed manager of the same company's Struthers Works, at Struthers, Ohio, succeeding James C. Kearns, resigned.

Walter J. Drummond of M. J. Drummond & Co., New York, arrived home on Monday from a European trip, during which he visited a number of British pipe foundries and ascertained that they were as crowded with orders as are the American foundries.

George T. Coppins, secretary Walworth Mfg. Company, Boston, sailed for England on the Ivernia, from Boston, May 28.

John C. Reed, general manager of the Standard Sanitary Mfg. Company, Pittsburgh, has been elected president of the Ohio Valley Bank to succeed the late Thomas B. Riter. John S. Craig, treasurer of the Riter-Conley Mfg. Company, has been elected a director of this bank.

Evans F. Jones, formerly with the International Harvester Company, Chicago, has been appointed vice-president and general manager of the Southern Steel Company, Birmingham, Ala.

William R. Webster, Philadelphia, attended the recent meeting of the Iron and Steel Institute in London. Among those elected to membership at this meeting were Archibald Johnston, president of the Bethlehem Steel Company, Bethlehem, Pa.; Arthur Simonson, Philadelphia, Pa., and A. R. Thomas, St. Louis, Mo.

L. I. Bregman has removed from Cleveland to Chicago, to take charge of the main offices of L. I. Bregman & Co., dealers in old material, at 534 First National Bank Building. The Cleveland office, at 933 Garfield Building, is in charge of J. D. Frisbie.

Broken Rails in Canada.

TORONTO, May 25, 1907.—Several of the railroad accidents that have recently happened in this country having been caused by defective rails, the Canadian Board of Railway Commissioners has decided upon a special investigation to find out, if possible, to what the defects are due. The railroad companies are co-operating with the board in the work of the inquiry. They have been asked by G. A. Mountain, chief engineer of the board, to submit the specifications to which they require rails to be made. The Canadian Pacific Railway Company has complied with this request. It is that company's rule to have the rolling of its rails watched by an inspector of its own, who is expected to see that there is no variation from the specifications in rails that are accepted. It is supposed that none of the railroad companies has been omitting any necessary precaution for the securing of rails as nearly as possible perfect in their several classes, but, since the outcry about broken rails, the care in this respect has probably been redoubled by the construction departments of all the companies. At all events, the engineers of all the roads are now looking into the conditions of rail making very closely. The Board of Railway Commissioners will receive the benefit of much of this private study of the matter with which to supplement the results of its own engineers' investigations.

Since November 15 there have been six fatal wrecks, of which the cause was ascertained in every case to be a broken rail. Several other wrecks, attended with great loss, have happened in the same period, but as there was no loss of life or personal injury, the board's inspector of accidents did not go exhaustively into the question of the primary cause. Of the six fatal wrecks known to be consequences of the breaking of rails four occurred on the Canadian Pacific Railway, the first at Kaministiquia, Ont., on January 6; the second at Brunel Station, Ont., on April 12; the third at Sand Point, Ont., on April 12; the fourth at Pettapiece, Man., on May 8. On the Grand Trunk Railway the other two happened, the first occurring at Woodstock, Ont., on November 15, and the second at Guelph, on February 26. Broken rails had not previously been reported as a cause of accident for about eight months. The whole of last summer there had been no reported mishaps of this kind to transportation, the last occurring before November 15 being that near Didgequash Bridge, N. B., on the New Brunswick Southern Railway, on March 19, 1906.

The facts obtained from these instances do not throw much light on the cause of rail breakages. They do show, however, that the brittleness is not confined to rails made in any particular works, or at any particular period, or by any particular process. The rail whose fracture caused the Guelph disaster was a Dowlais steel rail, made in 1888. The rail that gave way at Brunel Station was manufactured by the Johnson Company of Lorain in 1898. The failure of the English rail, made in 1889, was the cause of the Sand Point wreck. And it seems there was enough difference in the breaks to make it impossible for the observing engineers to form even a broad generalization as to the nature of the defect.

It is stated by the Ottawa correspondent of the *Toronto Globe*, the chief Government organ, that the rails now being laid by the Grand Trunk Pacific Railway Company in the West are American rails, the company, it is alleged, having declined to buy Canadian rails unless it received the benefit of a reduction in the price. It is said, further, that the cost of the American rails delivered is no less than that of the Canadian rails. Article 37 of the company's agreement with the Government requires it to purchase all its construction material and supplies from Canadian producers "when the same are produced in Canada and when such material and supplies can be purchased in desired quantities and of equal quality suitable for the purpose required, and for prices and upon terms equally advantageous with those procurable elsewhere."

The National Transcontinental Railway Commission, which is building the Eastern Division of the line the Grand Trunk Pacific Railway Company is to operate, is

using Canadian rails. The steamer Glenmount, which is now on her way from the Clyde, is to load next week at Sydney with rails for Quebec, to be laid on the Government Division of the National Transcontinental.

Satisfaction with the Sault rails is reported from all quarters. In their case the rolling process is said to be slower than in some American mills, a fact which may have a favorable bearing upon the physical qualities of the rails.

What the upshot of the inquiry will be no one can say. It has been suggested that the making of steel rails should be a matter of Governmental supervision. As the Dominion Government has jurisdiction over all but the most purely local lines in the country, as very many millions of cash aid have been given to the railroads by the Canadian people, and as the iron and steel industries are most liberally assisted by direct bounty payments, a case could be made out for Government supervision of manufacture.

C. A. C. J.

The French Reciprocity Movement.

WASHINGTON, D. C., May 28, 1907.—Many urgent requests are reaching both the State and Treasury Departments from prominent producers who are anxious that the Administration shall negotiate an agreement with France similar to that recently concluded with Germany. So strong has this pressure become that the correspondent of *The Iron Age* is in position to state that the Administration is now giving serious attention to the matter. There is a fair prospect that a commission will be dispatched to Paris, but whether this action is taken or not, there is good reason to believe that a satisfactory adjustment of the tariff controversy with France will be reached at an early date.

France Desires Negotiations.

While the North Commission was in Berlin an authoritative communication was received by its members inviting them to visit Paris before returning to the United States to make an investigation of tariff conditions looking to the formulation of a reciprocal trade agreement. The commission was without authority to act on this intimation, however, but when the American ambassador at Paris urged the State Department to send the commission to France the Secretary of State gave to the press an authorized statement to the effect that if the French Government desired to take up the tariff question through a commission the United States would promptly accede to its request. Up to the present time the French Government has not made a formal request, but its wishes in the matter are well understood here and in diplomatic circles, it is assumed that the French Government expects the United States to take the initiative in view of the fact that the maximum rates of the French tariff are now levied on practically all the products of the United States. In the meantime various measures increasing the rates of the French tariff on products chiefly imported from the United States are making more or less progress in the French Chamber of Deputies and American exporters in several important lines may any day find their wares shut out of France by the imposition of new and absolutely prohibitory duties.

The Interest of Iron and Steel Trades.

The pressure for the settlement of the controversy with France comes from two classes of producers in this country; 1, Those who have been able to build up a trade with France in spite of the maximum duties imposed on their products, but who believe that they could enormously increase their exports if they could obtain better tariff rates; and, 2, the producers of articles, which, like cotton seed oil, petroleum, Porto Rican coffee, &c., are threatened with new and prohibitory duties in measures now pending in the French Parliament. All manufactures of iron and steel imported into France from the United States are required to pay the maximum rates of the French tariff, while similar products imported from Germany and Great Britain pay the minimum rates. Nevertheless imports of American goods in these lines

have made notable gains since the new French tariff went into force in 1902.

It is a peculiarity of the French tariff that both maximum and minimum rates apply to nearly every item enumerated therein. In the case of the German tariff, on the other hand, conventional rates are provided as to less than one-half of the various classifications. This fact naturally serves to emphasize the importance of securing the minimum rates of the French tariff, especially as such rates range from 25 to 40 per cent. less than the maximum duties. A few illustrations will show the handicap under which American exporters of iron and steel products are now working. The maximum rate on locks, hinges and other builders' hardware is 20 francs per metric hundredweight, while the minimum rate is but 15 francs. The maximum rates on saws and other tools range from 18 to 27 francs, while the minimum rates are 12 to 22 francs. Iron and steel castings pay 12 to 25 francs, according to classification under the maximum tariff, and 8 to 18 francs under the minimum. On the important class of metal working machinery, which France took from us to the value of \$653,749 in 1906, the maximum rates range from 15 francs per hundredweight on heavy machines to 70 francs on fine instruments of precision, while the corresponding rates under the minimum schedule are from 10 to 50 francs. Printing presses pay a maximum rate of 8 francs and a minimum rate of 6 francs. The rates on stationary engines range from 17 to 30 francs maximum and from 13 to 20 minimum. Boilers and parts of engines carry maximum rates ranging from 12 to 24 francs and minimum rates of from 9 to 18 francs. Miscellaneous machinery pays maximum rates ranging from 15 francs per metric hundredweight upward and minimum rates averaging at least 20 per cent. less.

It is believed here by those in close touch with both German and French negotiations that France is prepared to extend to American products as generous treatment as that accorded by Germany in exchange for the concessions made by the United States in the German agreement. The German convention guarantees conventional rates as to more than 97 per cent. of the current imports of American products. Concessions of equal value in the French tariff would necessarily embrace the greater part of the iron and steel products now being shipped to France.

W. L. C.

The New Scout Cruiser Birmingham.

The first scout cruiser in the United States Navy, the Birmingham, was launched May 29 at the yard of the Fore River Shipbuilding Company, Quincy, Mass. The estimated speed of the new vessel, 24 knots an hour, while slightly less than that of the English scout cruisers, is more than compensated for by the ability to maintain such high speed in all conditions of weather. In addition, the American type has more than twice the coal capacity, and, therefore, a far greater radius of action than the English scouts. The Birmingham is 420 ft. over all, is 46 ft. 8 in. beam, and has a draft of 19 ft. The total coal capacity is 1250 tons, and her steaming radius at full speed is estimated at 1875, or 6250 miles at 10 knots an hour. It is estimated that she will develop 16,000 hp. The hull is built of steel throughout, with two longitudinal bulkheads and five decks, the main and berth decks being continuous from stem to stern. The battery will consist of two 5-in. and six 3-in. rapid-fire guns, and two 21-in. submerged torpedo tubes. The motive power will be derived from vertical engines, triple expansion type, and there will be the usual twin screws.

A correspondent of the New York *Herald*, writing from the City of Mexico, gives an interesting interview with President Diaz, in the course of which the latter made the following statement: "Mexico is financially in a very happy and prosperous condition. We have funds enough, but there is no Mexican of any broad ideas who does not welcome the influx of American capital to this country; our nation is as yet practically undeveloped. I am informed that not less than \$1,000,000,000 of American money is already invested in mines and other industrial enterprises."

The Machinery Trade.

NEW YORK, May 29, 1907.

Business the past week showed some improvement, the orders placed, though generally for small lots, footing up to the average sales of the past few weeks. The railroads have come into the market more freely, the expenditure of the Delaware, Lackawanna & Western Railroad for mine equipment being particularly heavy. An order worthy of note has been placed with a prominent Pittsburgh machinery house by traction interests, covering tools aggregating about \$30,000 in value. Inquiries are not so plentiful as they were a short time ago, though they are of sufficient volume to more than cover the tools that can be had on early delivery. Substantial inquiries have lately been received from some of the Southern railroads, and within the past few days the Norfolk & Western Railroad has issued specifications for additional equipment for its new Roanoke shops. Some uneasiness is felt over the labor situation, which is becoming acute in several districts.

Another Norfolk & Western Railroad Machine Tool List.

The Norfolk & Western Railroad has sent out specifications for additional machinery for its new shops at Roanoke, Va., which are to be equipped with about \$200,000 worth of new machinery and tools. Lists covering a portion of the tools required for these shops have been issued, and it is expected that the trade will be asked to bid upon a great many more tools than those covered by the specifications already received. In our issue of May 16 we published the requirements for the boiler shop. Under date of May 23 the purchasing department sent out the following list of additional machine tools, for which it is in the market, and bids on which are desired before June 5:

One 350-lb. belt driven hammer; one 42-in. Pond steel tire wheel lathe, complete with caliper attachments, tees, patent dog, wrenches, &c., machine to be motor driven with 230-volt direct connected variable speed field control motor, ratio 3 to 1, chuck plate 31 in. diameter, so as to get tool post close to work; two 24-in. wet emery grinders, large enough to take emery wheel 24 in. diameter, 2½ in. face; one No. 2 universal grinding machine, capacity 8 in., swing 30 in. between centers, emery wheel 8 in. diameter, 12 speed changes, with countershaft; one 1½-in. bolt header, to be supplied with cushion clutch, double stop action; one ¾ in. to ½ in. bolt header, complete with countershaft, wrenches and set of sample dies; one heavy combination punch and shear, 24-in. throat, to have capacity of cutting soft steel 2 x 8 in., and punching 2½-in. hole through 2-in. plate, quotation to be made with and without direct motor drive, 230-volt direct connected motor; one 28-in. portable valve seat facing machine; one Yankee twist drill grinder, capacity ¼ in. to 3½ in.; one portable cylinder boring bar, capable of re boring cylinders 22 in. diameter, 32 in. stroke; one 36-in. heavy pattern sliding head upright drill press, with back and positive gear feed, automatic stop and quick return of spindle, complete with tapping attachment and wrenches; three 16-in. engine lathes, 3 ft. between centers, to be complete with compound rest, quick change feed mechanism, and arranged for cone pulley drive; one 18-in. Fox brass turret lathe, complete with countershafting, &c.; one 6-in. pipe threading machine, complete with countershaft; one 51-in. vertical boring mill, to have two adjustable heads on movable cross rails; one double punch and shear, capable of punching 1½-in. hole through ¾-in. plate, and shear ¾-in. plate and 1¾-in. iron or their equivalent, machine to have 18-in. throat; one 30 in. x 30 in. x 8 ft. planer, with two cross heads on cross rails, machine arranged for parallel drive, complete with countershafts and wrenches; one 24-in. movable head shaper; one guide grinder, complete with nine emery wheels 9 in. diameter, and saw sharpening attachment; one horizontal milling machine, 38 in. width between uprights, maximum height of spindle above table about 38 in., cutters to be 15 in. diameter, cross rail to be counterweighted. All machines are to be furnished with necessary countershafts.

Lackawanna Railroad's Shop Expenditures; Making Heavy Mining Machinery Purchases.

It will be remembered that in our first issue of the year we stated that the Delaware, Lackawanna & Western Railroad had decided to spend between \$500,000 and \$750,000 this year for new shops and equipment. We are officially informed that the company has appropriated for expenditure this year about \$500,000 for erecting part of its new plant at Scranton, Pa. This expenditure covers the erection of the foundry, 120 x 400 ft.; blacksmith shop, 125 x 300 ft.; pattern storage house, 65 x 325 ft., and casting platforms with outside cranes for handling heavy materials in the yard. No new machinery outside of the cranes has been ordered for these buildings, which are now in course of erection, nor

does the company contemplate buying any additional machine tool equipment for this plant this year. This work will be followed next year by the construction of other buildings included in the plans for this plant, consisting of an erecting machine, boiler and tank shop, 346 x 582 ft.; paint shop, 90 x 162 ft.; mine repair shop, 80 x 250 ft.; power house, 90 x 160 ft.; scrap platform, 40 x 400 ft.; laboratory, 40 x 70 ft.; roundhouse and other smaller structures. The company has recently spent between \$40,000 and \$50,000 for new tools for its new Kingsland shops. The most important work now in hand, in connection with machinery purchases, is the expenditures being made for new equipment for its different collieries in the vicinity of Scranton, Pa. The coal department is spending between \$200,000 and \$300,000 for new machinery, mostly electrical, for installing in its different mines in that territory.

The Central of Georgia Railroad informs us that it is not yet prepared to take up the matter of equipment for its new shops at Macon, Ga. Grading is now being done for the shops, and as soon as this is completed, it is expected that the work of erecting the buildings will be started.

The Pittsburgh & Westmoreland Railroad Company, whose chief engineer is James Bryan, with offices in the Park Building, Pittsburgh, Pa., will place contracts shortly for 6 miles of single track and for a steel bridge 360 ft. long. The company is preparing plans for a carhouse and repair shops, equipment for which will be purchased later.

We have previously given the details of the power equipment that the Michigan Central Railroad intended to install to operate its tunnel under the Detroit River. It seems that the company has decided not to install a power plant, and has decided to purchase power for operating the system from the Detroit Edison Company, which has lately placed orders with the General Electric Company for a substantial amount of new equipment.

Hudson Companies' Machinery Requirements.

The Hudson Companies is preparing to erect at Hoboken, N. J., a building 50 x 190 ft., to be used partly for storage purposes and partly as a repair shop. The company is now purchasing equipment for the proposed building, which includes some machine tools, grinding machinery and a general assortment of equipment such as will be required for making repairs to tools and machinery. The purchasing is being done from the company's office at 111 Broadway. Purchases are also being made by the Hudson Companies for the new terminal building in course of construction at the New York end of the McAdoo tunnels. The company has placed orders with the Providence Engineering Works for two 480-hp. tandem compound direct connected engines, and orders are being placed for the other power equipment, including the boilers. Plans are also being prepared for a small car repair plant and power house to be located in Jersey City. It is thought that very soon the trade will hear of some machine tool requirements for that plant. The power equipment has, it is understood, been arranged for.

It is announced that the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., has accepted the plant and business of the Hadaway Electric Heating & Engineering Company, New York, manufacturer of electric heating apparatus, which will form the nucleus of a new department which the Westinghouse Company, it is expected, will develop into an important part of its business. The company will move the plant to East Pittsburgh and probably enlarge the facilities. W. S. Hadaway, the head of the Hadaway Electric Heating & Engineering Company, has accepted a position with the Westinghouse Company as manager of the new department.

William McNeil & Co., New Glasgow, N. S., whose bridge and structural iron works was recently destroyed by fire, intend to rebuild on a large scale, but have not yet selected a site for the new works. The City Council of Halifax has offered 10 acres upon which to build the shops, and provided no objectionable circumstances arise, the firm intends taking advantage of the offer and erect its plant in that city.

The Degnon Contracting Company, 60 Wall street, New York, which has been awarded the contract for the construction of the first section of the Subway loop between the East River bridges, will in all probability purchase considerable outdoor equipment during the carrying out of its contract. The company has a large contracting plant ready for operation, but it is understood that from time to time considerable buying will be done to meet machinery needs as they arrive. The company's bid for the tunnel construction was \$2,952,000, and \$83,000 extra for building pipe galleries.

Manning, Maxwell & Moore, 85 Liberty street, New York, in order to strengthen their facilities for supplying the demand for prompt shipments of machinery, have planned the erection of a large storage warehouse in Jersey City, to be 110 x 260 ft., two stories. The building is to be of brick and steel construction, with heavy concrete floors and absolutely fireproof throughout. Each floor will contain 40,000 sq. ft. The building will be equipped with a 20-ton electric traveling crane and a hydraulic elevator, and it will be built especially for the purpose of storing machine tools and supplies. The structure will be located opposite the freight office of the New Jersey Central, and tracks will connect

the building with the railroad. The company will maintain its present warehouse in New York, and the new warehouse is intended principally for the storage of large lots of machinery to be held in readiness for a heavy demand for quick delivery.

Because of the continued demand for its automatic gear cutting machines and crank shapers the Eberhardt Brothers Machine Company, Newark, N. J., announces that it has decided to discontinue the manufacture of crank shapers and will give exclusive attention to its specialty, which is the design and manufacture of automatic gear cutting machines and gearing. The Machine Sales Company, New York, has arranged to take over the production of shapers and will manufacture them at its extensive plant at Peabody, Mass. There will be no interruption in supplying the market.

The Case Mfg. Company, Columbus, Ohio, through its New York office, 90 West street, has received an order from the Lobbell Car Wheel Company, Wilmington, Del., for a 5-ton 62-ft. span three-motor electric crane.

H. B. Sweet, Clarendon Building, Utica, N. Y., as consulting engineer for the municipality of Sherburne, N. Y., is receiving bids on a 75-kw. direct connected generator and one 150-hp. horizontal tubular boiler, to be installed in a municipal lighting plant to be erected at a cost of \$15,000.

Alfred Dralle, Middellandstraat 85, Rotterdam, Holland, who has traveled much in Holland and Germany as a machinery salesman, has established an export business at the above address, and desires to make connections with American manufacturers of machine tools, agricultural machinery and general machine shop equipment. He wishes to hear from American houses, with a view to getting exclusive rights for Holland.

The Canal Board has approved plans for the additional expenditure of \$7,750,000 on the Erie Barge Canal, and it is expected that bids will be asked for the work within the next two weeks. The contracts approved were: No. 12, covering excavations from Oneida Lake westward 42 miles; No. 14, construction of locks and dams in the Mohawk River between Amsterdam and Little Falls; No. 35, excavation of the Oswego Canal near Fulton.

Business Changes.

The Queen City Punch & Shear Company, Cincinnati, Ohio, manufacturer of punching and shearing machinery, straightening and bending rolls, &c., has appointed H. J. Koontz, 723 Bessemer Building, Pittsburgh, as its agent for the Pittsburgh District.

Chicago Machinery Market.

CHICAGO, ILL., May 28, 1907.

While the machine tool market has for the past week been comparatively quiet, dealers are not disposed to regard the temporary lull as indicative of anything more important than a fluctuating tendency of trade. General conditions have not changed, nor has the need of tools for present service lessened. Buying by the railroads generally is extremely light, but for that matter very little business is expected from this source throughout the remainder of the year. Dealers report, however, that the Grand Trunk Railroad is placing some orders for tools which were included in the extended list promulgated some weeks ago. Other large requirements heretofore mentioned are still withheld. There is, indeed, no incentive to bring such buyers into the market, unless, perchance, it be a fear that the demand responsible for present congestion of producing capacity may run on unchecked for some time. But the probability of such a contingency is regarded as too remote to influence present action. As matters now stand, a large part of the specifications involved in these deferred tool requirements could not be furnished for months to come, and if placed now would only add to the burden of overloaded order books. The prevailing attitude of buyers respecting forward delivery purchases is not without its effect, for it is becoming more and more apparent that progress is being made by machine tool makers in catching up on delinquent orders. While it is true that here and there various concerns are as badly behind as ever, dealers nevertheless agree that the general situation shows improvement, which, though slight as yet, indicates a turn in the right direction.

A vague conjecture that perhaps not a few tool orders have been placed, both by dealers and users, in a more or less speculative way, finds confirmation in information that points with a considerable degree of positiveness toward the correctness of the surmise. Since cancellation privileges are in most cases not over closely hedged by limitations, it has been possible for dealers to place extended delivery orders without much regard to possible future market conditions. As long as the demand is sustained their place on the order book is preserved; should it subside, cancellations

on comparatively short notice would relieve them of responsibility. So far, of course, there has been no occasion to exercise the cancellation privilege. A representative of a manufacturing interest, commenting on this phase of the question, said that its order, embodying large requirements, was placed for delivery 12 months ahead, with a provision for cancellation on 90 days' notice. Whether the order will be executed or not will depend wholly upon industrial conditions at the expiration of that period.

One notable result of the phenomenal activity in practically all machinery lines is the effect it has had on the development of new inventions and improved designs of tools and machines. While there is an abundance of new ideas on paper, they are extremely slow in making their appearance in concrete results. Shops are too busily engaged in the task of taking care of orders for goods of established pattern to devote much time to experimental work. There are, in consequence, many improvements thus held in abeyance awaiting a less strenuous period for their final completion. Another phase of the situation is seen in the closer adherence by manufacturers to standard lines and their reluctance to take orders for machinery deviating in any way from stock shapes and sizes. Not only is this true, but some makers have suspended the manufacture of certain of their less profitable lines in order to increase their output of the better paying articles, for which the demand is sufficient to engage the entire shop capacity. A case in point is that of a large manufacturer, who in addition to gas engines has for years been a prominent maker of air compressors. Being crowded with profitable orders for the former, the sale of the latter has been discouraged to an extent that means the manufacturer's temporary withdrawal from the market.

Reference was recently made in these columns to an important contract for oil pumping equipment, then pending, to be installed along the oil pipe line being built by the Southern Pacific Company from the Kern River oil fields to tidewater at San Francisco. This contract, which is of more than passing interest, not only because it is the largest of the kind ever placed in this country, but because of the special design of pumps to be used, was let to the George E. Dow Pumping Engine Company, San Francisco. It is thought that a considerable portion of the work of building the machinery equipment will be distributed among Eastern shops.

The Chicago Pneumatic Tool Company, Chicago, will be a prominent exhibitor at the coming exhibition of machines at the annual conventions of the Master Car Builders' Association and the American Railway Master Mechanics' Association at Atlantic City, June 12 to 20. Space at the right of the band stand has been reserved, in which an interesting display of pneumatic and electric tools will be shown. Of special interest will be a new pneumatic air turbine drill and an electric compression riveter, which have just been completed and will be presented to the trade for the first time on that occasion. Both will be shown in operation, and rivets for the latter will be heated in an electric forge.

The Lincoln Electric Street Railway Company, Lincoln, Ill., has been purchased by the Lincoln Railway & Light Company. It is the purpose of the company to make extensive improvements to these properties, which will include a new power house, work upon which will be begun without delay. A battery of Sterling boilers has been bought for the new plant, and some electrical machinery is yet to be placed. The present company is represented by W. H. Schott, contracting engineer, American Trust Building, Chicago.

The Warren Electric Mfg. Company, Sandusky, Ohio, states that it is in the market for gas engines, one of 80 hp. and one of 160 hp., of any reliable make.

Among the recent removals in the machinery district the following are noted: The National Stamping & Electric Works, formerly at 60-62 South Clinton street, has moved to 155-159 South Jefferson street; E. O. Williams, dealer in engines, pumps and second-hand machinery, is moving from 67 South Clinton street to 143-145 South Clinton street, where the first and second floors will be occupied by the offices and warerooms.

Cincinnati Industrial Notes.

CINCINNATI, OHIO, May 27, 1907.

The Cincinnati Industrial Bureau has begun an active advertising campaign, which it is proposed to carry on vigorously until every manufacturer in the country has been made fully acquainted with the advantages which the city possesses as a manufacturing center. Secretary Finch has arranged with a number of the leading trade publications of the more important industries to carry out this programme, which is now being done. A special fund for this purpose, probably amounting to \$100,000, is being raised among the business interests of the city, one contribution alone amounting to \$8000.

The large number of immigrants constantly arriving at New York has attracted the attention of Cincinnati manufacturers, who at times find common laborers rather scarce, and considerable study has been given the past few months to some plan of diverting a part of these immigrants to this city. The Industrial Bureau has offered its services to manufacturers along this line, to act as an agent in making the necessary connections with the various immigrant societies and bureaus in the East. A number of such laborers have been brought here under this arrangement, care being taken to secure men of a desirable class. While no actual shortage of labor exists, the many new manufacturing plants that are locating here, as well as those already in existence that are constantly enlarging and expanding their facilities, need so many men that it was deemed best to anticipate a possible shortage by taking the necessary steps to bring in these additional workmen.

The D. T. Williams Valve Company, within the next week or two, will be permanently located in its new home, a few squares east of the present quarters. It is expected that the office portion of the plant will be removed Saturday of this week, and the remainder of the departments follow shortly. The company has purchased 20 new brass lathes and millers, which have been placed in the new building ready for service. With the additional floor space afforded by the change the output of the present plant will be doubled without utilizing the entire space. Trade is unusually active and strong.

The Ralston Steel Car Company, Columbus, Ohio, will have a fine display at the Master Car Builders' convention, to be held in Atlantic City next month. The exhibit will consist of both standard steel cars and steel underframe cars, of which the company makes a specialty.

The quarterly meeting and dinner of the Cincinnati branch of the National Metal Trades Association will be held at 6.30 p.m. Friday, May 31, at Chester Park. The feature of the meeting will be an address by M. W. Alexander, vice-president of the General Electric Company, on "Practical Trade Schools."

Philadelphia Machinery Market.

PHILADELPHIA, PA., May 28, 1907.

The local machinery market continues rather quiet, and the demand for single tools seems to have fallen off to some extent during the past week. The machine tool requirements of the Standard Cast Iron Pipe & Foundry Company have been finally placed. A large share of this business went to one of the local machine tool houses, the balance being divided among some four or five other concerns. Orders have also been placed among the local dealers for a good portion of the machinery requirements of the Philadelphia Board of Education for the equipment of the new Southern Manual Training School. These two lots of tools have helped out materially on the volume of business done in the local market during the past week. The outlook for the immediate future, however, is considered very good. The Norfolk & Western Railroad has specifications out for tools for the Roanoke, Va., shops, and several other propositions of importance are expected to be acted upon at an early date.

Manufacturers continue fully occupied, although incoming business, as a rule, is hardly as large as the present productive capacity of plant. Tool builders have in a few cases been able to catch up some on deliveries, while in others no improvement in shipping dates is yet to be had. A number of the local machinery builders were interested in the exhibition of the Foundry Supply Association in this city last week, while others are preparing exhibits or making plans to attend the coming convention of the Railway Master Mechanics at Atlantic City during the early portion of next month.

The foreign demand for special tools and machinery continues active. That for tools of the standard types, however, is weak. Manufacturers of power transmission machinery and machine shop specialties who have an established trade abroad report business fully up to the average at this season.

Second-hand machinery continues active. The demand for tools, particularly those of the larger and medium size standard tools, is good, and dealers frequently find it difficult to supply the wants of their customers. Second-hand boilers and engines are more active and quite a fair volume of business is reported.

There is a somewhat better demand for boilers and engines, particularly those of the larger horsepowers, for central power plant stations. Those of the medium horsepowers have also been more active, and the trade generally is considered in a more satisfactory condition.

The foundries continue quite active. In some cases it is understood that slightly better deliveries can be had, but as a rule both steel and gray iron foundries have about as much business as can be well taken care of. The scarcity of

molders has curtailed production as well as delayed deliveries in a number of cases.

D. J. Slowe, formerly connected with the Williamsport Clutch & Pulley Company, Williamsport, Pa., and Hanson Robinson, until recently superintendent of the American Foundry & Machine Company, Hanover, Pa., have been added to the selling force of the Vandyke-Churchill Company, machinery merchant, on the Bourse machinery floor.

Hill, Clarke & Co., Incorporated, machinery merchants, George H. Baush, manager, who have been located on the Bourse machinery floor for some time, are preparing to vacate and will remove on June 1 to 512 Arch street, where they will occupy the first floor and basement. The new quarters will give them 2700 sq. ft. of floor space.

The Keystone Steel Casting Company, Chester, Pa., will remove May 31 from its temporary office in the Cambridge Building to the office at its new works now being constructed at Sixth and Lloyd streets, near Lamokin Station, Chester, Pa.

Ph. Bonvillain & E. Ronceray, Paris, France, who exhibited an assortment of foundry molding machines of a swinging type, together with other foundry equipment, at the exhibit of the Foundry Supply Association last week, have established an office in this city at 1315 Race street, where the business of the firm in this country will be transacted.

W. E. Shipley, machinery merchant, on the Bourse machinery floor, reports business during the past six weeks to have been above the average, made up chiefly of a number of miscellaneous orders. During the past week orders were booked for quite a large number of small tools for the equipment of the new South Philadelphia Manual Training School, as well as a number of smaller orders. From present indications, the outlook for new business in the near future is considered favorable.

H. B. Underwood & Co. note a material increase in the foreign demand for their special portable railroad shop repair tools, and several orders for boring bars of different sizes have been booked for shipment to London, England. The domestic railroads, particularly in the South and West, have also placed good orders, as have also a number of the larger industrial concerns. Every department of the plant continues very busy, and deliveries of portable cylinder boring bars, valve seat rotary planing machines and other portable tools have been made to both foreign and domestic customers. A special 6-in. boring bar, 15 ft. long, has been recently shipped to the Chambersburg Engineering Company, Chambersburg, Pa.

The Otto Gas Engine Works, Philadelphia, Pa., has just placed orders for machine tools aggregating about \$40,000 in value.

Cleveland Machinery Market.

CLEVELAND, OHIO, May 28, 1907.

There has been a slight falling off in the demand for machine tools in the local market during the past week, although the lull has not been noticed by all the dealers. There are a fair amount of inquiries coming in, however, and it is believed that the decrease in the volume of buying will only be temporary. Orders continue to be booked for small lots of machine tools, the demand being about equal for all kinds of tools. The business of the dealers seems to be restricted more than ever by their inability to make quick deliveries. While some customers are willing to anticipate their wants and place orders for tools for delivery six months or more from now, there are many who, on finding that they have no hope of securing the tools they want for several months, refuse to place orders for that far ahead. Nearly all the inquiries are for tools for immediate delivery, and if dealers could promise shipment at once, or within a few weeks, their sales at present would be much larger. Dealers have very few tools in stock, and it is only in exceptional cases that quick delivery can be promised. The present condition of the market has made the demand for good second-hand tools stronger than ever, but these tools have been so well cleaned up that it is seldom that one can be found for sale. Those that are occasionally placed on the market are quickly grabbed up at high prices. While a few new manufacturing companies are being projected that will require good sized lists of tools if the projects are carried out, the number of new enterprises in the air is smaller than usual at this time of the year.

The Chanute Cement & Clay Products Company, Chanute, Kan., in a few weeks will begin the erection of a large cement plant with a capacity of 3000 barrels per day. The plant will cost about \$750,000, of which \$600,000 will be for machinery. The Osborn Engineering Company of this city is preparing the plans and will receive the bids for the machinery equipment in about 30 days. The list has not yet been prepared. J. F. Townsend, Akron, Ohio, is president of the cement company.

The American Stove Company has decided to rebuild on

a larger scale the plant of the National Stove Company, Lorain, Ohio, which was recently partially destroyed by fire, provided the city will furnish adequate fire protection in the vicinity of the plant. If Lorain fails to comply with the company's request, the company will tear down the remainder of the plant and erect a new one, probably adjoining the plant of the Dangler Stove & Mfg. Company, in Cleveland, where it has an available site. Some repairs have been made to the Lorain plant, and it is now in partial operation.

The Hocking Valley Railway Company has awarded the contract for the main freight repair shop at its new shops at Logan, Ohio, to the Mt. Vernon Bridge Company, Columbus, Ohio. The building will be 162 x 500 ft., of structural steel, covered with corrugated iron. It will contain one 10-ton and two 5-ton electric traveling cranes, the contracts for which have been awarded to the Case Mfg. Company, Columbus. All the machinery in the shops will be driven by individual motors. The Mt. Vernon Bridge Company has also secured the contract for the erection of a new channel span for the Kanawha & Michigan Bridge across the Ohio River at Point Pleasant. The span will be 400 ft. long.

The W. S. Tyler Company has commenced the erection of a warehouse, 60 x 264 ft. The building will be one story high, but the foundations will be provided for a four-story structure, with the view of adding the additional stories later. The company is having plans prepared for a large addition to its ornamental iron department. The addition will be built during the coming summer.

The Osborn Engineering Company, Cleveland, Ohio, has been awarded the contract for building a bridge across the Ohio River at Owensboro, Ky., for the Owensboro & Rockport Bridge & Terminal Company. It will also build 12 miles of railroad for the terminal company on the Indiana and Kentucky sides of the river. The total contract amounts to about \$1,500,000.

The Sill Pneumatic Horse Collar Company, recently organized in Bloomington, Ill., with a capital of \$100,000, is looking for a location, and may decide to build a new plant in Toledo, Ohio. The Toledo Machine & Tool Company is engaged in making considerable special machinery for the new company.

The recently incorporated Dayton Iron Store Company, Dayton, Ohio, has organized by the election of I. E. Jones, president; John E. Voit, vice-president; Charles W. Bieser, treasurer, and Charles F. Bryany, secretary and general manager. It will be located in a six-story and basement building on East First street, where it will handle bar iron, machinery steel, tool steel, carriage and wagon trimmings and a general line of hardware.

The Seitz Automobile & Transmission Company, Monroe, Mich., has been incorporated with a capital stock of \$500,000 to manufacture friction gear automobiles and trucks. It is reported that the company will build a large factory in Monroe.

The Ohio Central Railroad has commenced the erection of an addition, 90 x 800 ft., to its shops at Bucyrus, Ohio. The building will be equipped with a 20-ton electric crane and will be used as a car shop.

New England Machinery Market.

WORCESTER, MASS., May 28, 1907.

The unexpected influx of a large number of second-hand machine tools in the market is having some effect upon conditions, and the Boston dealers expect that it will be felt in the demand for new machinery. A number of concerns using machine tools in various parts of the country, and including several automobile companies, it is understood, have recently gone out of business, making available entire equipments, the total of which is very considerable. This is as true in the West as it is in Boston. One dealer who recently circularized manufacturers for second-hand tools is receiving answers beyond all expectations, offering machinery for sale. Prices of second-hand tools are ruling much lower than last year, when auction sales were actually sensational in the bids received, and when pretty much anything in the way of a machine, no matter what its age, could be disposed of. Most dealers are now buying only such tools as are comparatively new and in good condition, and are not paying high prices. It is natural enough to suppose that when good second-hand tools can be had for immediate shipment they will be seized with avidity by customers who have been fretting because their requirements could not be met in the market.

Apart from this new element in the trade, conditions do not seem to change greatly. Most sales specify deliveries no later than four months, though some very good orders have been placed for shipment in the autumn, and even in 1908. The dealers are showing a greater conservatism in placing stock orders. A certain amount of this class of

business is being placed with the understanding that orders may be canceled up to three months or so before date of agreed delivery. As a rule, however, the machine tool builders are insisting upon a stricter obligation on the part of customers, both dealers and consumers, as to their fulfillment of their part of the contract.

The idea of cancellation in any form is quite foreign to conditions as they exist to-day. The word is spoken only in connection with the greater conservatism shown in placing business for late delivery. Machine tool builders see little, if any, difference in the volume of business booked. Their dealers are just as urgent in their demands for machinery for early shipment to customers. A failure to deliver a stock order on an agreed date quickly develops vigorous complaint. Of course a considerable apportionment of orders on the manufacturers' books is from dealers to replete their stocks, but the greater volume is for customers at home and abroad.

Buyers of machinery are doing more shopping around than has been their custom for a year past. It has until recently been impossible to gain anything but delay by this method. To-day the customer can do a little better at times, largely because dealers are receiving machinery on stock orders placed months ago. A buyer can pick up quite a variety of equipment for early delivery, though he can by no means secure a complete equipment, some tools being as scarce as ever, notably milling machines, grinding machines and all types and most sizes of automatics. Shopping around does not better prices. The gain is all in time, not in money.

The railroads of New England have begun to talk economy, in common with those of some other parts of the country. Their purchasing agents, together with those of some manufacturing establishments, have rather a distorted idea of conditions. They are, possibly, too sanguine in their hopes of getting much better prices by holding off awhile. No one in the trade believes that prices of machine tools will drop seriously. The general opinion is that a slight reaction from the enormous demand of last year has set in, taking the form, not of a falling off of the demand for machinery for immediate use, but in a greater hesitation in buying for late in the year or early in 1908. The market has undoubtedly come down to a slightly lower level of demand. Manufacturers of machine tools and the dealers, and customers themselves among manufacturers, believe that there will be little, if any, further shrinkage in demand, excepting, perhaps, a return of the normally quiet days of the hot months, which were not experienced in 1906.

Doubtless one reason for erroneous opinions concerning the situation lies in the difficulty of discussing the question at all without conveying a false and exaggerated impression of the changes that have taken place during the past few weeks. It should be emphasized that the difference between business to-day and the first of the year is really a very slight one. The books of both builders of machine tools and the dealers demonstrate this beyond a doubt. For example, the business of one dealer for the first five months of 1907 stands close to the corresponding period of 1906, though the latter included the phenomenal month of May, which footed prodigious totals. Demand could drop a number of pegs below the present point without making a serious impression upon the business. Practically the only effect would be to improve delivery. Most important of all is that here in New England at least the users of machine tools are as busy as they ever were, and are keeping right along with their enlargements and improvements in anticipation of a protracted period of good business. The change resolves itself into a slight drop from a demand so great that had there been no reaction the trade would have become hopelessly congested. Had the machine tool business been two-thirds as great two or three years ago as it is to-day it would have been considered eminently satisfactory. The talk of falling prices will prove to have been entirely groundless, no doubt, excepting with second-hand tools, which have merely dropped from a fictitious value, in which immediate availability counted for everything in fixing prices.

Lists are out for the equipment for the new naval torpedo factory at Newport, R. I., where the department will manufacture its own engines of war of this class. The dealers were caught napping, for the lists were not expected so early, and little, if any, preliminary effort had been made to shape the specifications. The total of new machinery, of a miscellaneous character, is a large one. The entire equipment of a high-class machine shop will be purchased.

Worcester machine tool builders are progressing rapidly upon new buildings which have already been announced, with the exception of the F. E. Reed Company, lathe builder, which has hardly begun the work of building its large addition, though the contract has been placed. This building will be 83 x 130 ft., three stories, and will be used for storage and assembling, releasing considerable space in present building for machine shop purposes. The Norton Grinding Company has roofed in its large addition, which will practically double the works, the building being 86 x 278 ft., a duplicate of the present building. The new building will be used mostly as an erecting shop, releasing room in the pres-

ent building for manufacturing. Much of the new equipment is already on the floor. The large new plant of J. E. Snyder & Son, manufacturers of upright drills, will be ready for occupancy in another month or so. The Heald Machine Company, builder of grinding machinery, has begun work on the addition that will more than double its capacity.

The Corbin Motor Vehicle Corporation, New Britain, Conn., manufacturer of automobiles, is to increase its manufacturing facilities by the erection of a brick building, 62 x 92 ft., and five stories.

The John L. Parker Company, Worcester, Mass., manufacturer of sheet metal specialties and sheet metal goods in general, has purchased the property on Jackson street occupied by P. Blaisdell & Co., Worcester, before the merging of that business into the Whitcomb-Blaisdell Machine Tool Company. The John L. Parker Company, of which Frank R. Jones is manager, will remodel the buildings for its purposes. The company will have three times the room now available at its present factory on School street. Manufacturing facilities will be largely increased, and a little later the company will be in the market for new presses and other machinery. The business has grown rapidly under its present management and the necessity of more room became imperative. The Blaisdell shops have been occupied for about a year by the Plunger Elevator Company, which has now vacated the premises. This company is moving its entire Worcester business to the new shops at Buffalo. The main shops at Barber's Crossing are the property of the Norton Company, which will occupy the large building for an enlargement of its manufacturing facilities. The building is on land adjacent to its plant, so that the extension in this direction is a natural one.

The Sullivan Machine Company, Claremont, N. H., is about to erect a large addition to its works, which will be devoted to foundry purposes.

The National Casket Company is planning to make important alterations and improvements at its New Haven, Conn., plant, but the management states that no decision as to details has been arrived at.

Government Purchases.

WASHINGTON, D. C., May 28, 1907.

The commanding officer of the Frankford Arsenal, Philadelphia, Pa., will receive bids until June 14 for one 350-kw. engine driven generator, one 350-kw. and one 500-kw. turbo generator, one horizontal or vertical cross compound engine, one 350-kw. generator, one 200-hp. water tube boiler, one condensing outfit, &c.

The Isthmian Canal Commission will receive bids until June 4, circular No. 367, for shop machinery and other supplies.

The Isthmian Canal Commission will soon ask bids for two 20-in. pipe line suction dredges.

The Isthmian Canal Commission will receive bids until June 10, circular No. 368, for hoisting engines, lathes and other supplies.

The following bids were opened May 17, circular No. 363, for supplies for the Isthmian Canal Commission:

Bidder 11, the Becker-Brainard Milling Machine Company, Hyde Park, Mass.; 24, Camden Iron Works, Camden, N. J.; 29, Chicago Pneumatic Tool Company, New York; 31, Wm. Wirt Clark & Son, East Baltimore, Md.; 45, Deane Steam Pump Company, New York; 47, Drew Machinery Agency, Manchester, N. H.; 49, Epping Carpenter Company, New York; 50, Fairbanks Company, New York; 54, Geo. S. Fowler, Washington; 57, Frevert Machinery Company, New York; 59, Garvin Machine Company, New York; 64, Halliday Machinery Company, Seattle, Wash.; 73, Independent Pneumatic Tool Company, Chicago, Ill.; 74, Ingersoll-Rand Company, New York; 77, Jones & Lamson Machine Company, Springfield, Vt.; 85, Lucas Machine Tool Company, Cleveland, Ohio; 91, Manning, Maxwell & Moore, New York; 100, Motley, Green & Co., New York; 109, Niles-Bement-Pond Company, New York; 110, A. D. Norton, Incorporated, Boston, Mass.; 114, Ohio Injector Company, Wadsworth, Ohio; 115, Jones, Ohlen & Son Saw Mfg. Company, Columbus, Ohio; 121, Pilling Air Engine Company, Detroit, Mich.; 123, Prentiss Tool & Supply Company, New York; 128, H. A. Roger Company, New York; 129, Joseph T. Ryerson & Son, Chicago, Ill.; 133, Wm. Sellers & Co., Philadelphia, Pa.; 140, Standard Scale & Supply Company, New York; 142, Stauffer, Eshleman & Co., New Orleans, La.; 151, Vandyke-Churchill Company, New York; 153, Vermilye & Power, New York; 162, Fox Bros. & Co., New York; 164, F. S. Banks & Co., New York.

Class 1. One planer—Bidder 50, \$3240, commence 180 days; 57, \$3810, 190 days; 59, \$4124, 225 days; 64, \$3849, 50, 160 days; 91, \$3693.90, 240 days; 100, \$3521.25, 180 days; 109, \$3995, 230 days; 123, \$3995, \$4495 and \$2656, 180 days; 133, \$3570, \$3765 and \$3955, 240 days; 151, \$3885, 130 days; 162, \$3680, 185 days.

Class 2. Boring and turning mill—Bidder 91, \$8263, 300 days; 109, \$11,745 and \$11,950, 15 days.

Class 3. Two radial drills—Bidder 50, \$2970, no time;

57, \$3088 and \$3290, 325 days; 64, \$3291.40, 160 days; 91, \$2969.84, 180 days; 109, \$3260 and \$3050, 150 days; 123, \$3355, 185 days; 151, \$3155 and \$3355, 130 days.

Class 4. One countersinking radial drill—Bidder 91, \$462.30 and \$583.18, 90 days; 129, \$450, 60 days; 162, \$610, 80 days.

Class 5. One boring and drilling machine—Bidder 85, \$3256, 180 days; 91, \$3562.60, 300 days; 109, \$2630, 140 days; 123, \$2237, 115 days.

Class 6. Two sliding head drill presses—Bidder 50, \$946, 120 days; 59, \$1170, 195 days; 64, \$657.70, 140 days; 91, \$714, 360 days; 109, \$860, 120 days; 151, \$690, 90 days; 162, \$620 and \$750, 120 days.

Class 7. Three drill presses—Bidder 50, \$471, 90 days; 59, \$612, 105 days; 64, \$463.89, 140 days; 91, \$549.45, 360 days; 109, \$660, 180 days; 123, \$460.50, 128 days; 151, \$450, 90 days; 162, \$582 and \$645, 145 days.

Class 8. One drill press—Bidder 50, \$252, 120 days; 59, \$295, 165 days; 64, \$178.28, 140 days; 91, \$199.45, 360 days; 109, \$258, 180 days; 123, \$179, 155 days; 151, \$220, 90 days; 162, \$194 and \$215, 145 days.

Class 9. Cylinder boring machine—Bidder 57, \$899, 60 days; 91, \$1141.09, 90 days; 100, \$1168.25, 60 days; 162, \$1210 and \$817, 50 days.

Class 10. One milling machine—Bidder 11, \$1512, 200 days; 57, \$1794, 280 days; 140, \$1415.18, 190 days; 91, \$1325.76, 360 days; 109, \$1648, 240 days; 151, \$1500, 120 days; 162, \$1594, 280 days.

Class 11. One plain milling machine—Bidder 11, \$1045, 200 days; 57, \$1145, 280 days; 140, \$1011.44, 160 days; 91, \$1017.29, 360 days; 109, \$1060, 240 days; 151, \$1085, 215 days; 162, \$1150, 280 days.

Class 12. Hand milling machine—Bidder 11, \$238, 175 days; 50, \$210, 60 days; 57, \$255, 280 days; 91, \$199.50, 100 days; 100, \$199, 90 days; 115, \$365, 60 days; 162, \$209, no time.

Class 13. One pillar crank shaper—Bidder 64, \$970.07, 130 days; 91, \$928.70, 90 days; 115, \$670, 30 days; 162, \$858, 145 days.

Class 14. One crank slotter—Bidder 50, \$1670 and \$2175, 90 days; 57, \$1834, 280 days; 91, \$1957.90, 240 days; 109, \$1770, 155 days; 133, \$1860, 180 days; 162, \$1795, 265 days.

Class 15. One bolt cutter—Bidder 50, \$710, 90 days; 57, \$665, 100 days; 64, \$759.76 and \$759.32, 130 days; 91, \$816.50 and \$906.50, 30 days; 114, \$659, 90 days; 151, \$655, 60 days; 162, \$810, 100 days.

Class 16. One pipe cutting and threading machine—Bidder 47, \$1065, 30 days; 50, \$1116.25, 20 days; 57, \$1116.25, 40 days; 64, \$978.70, 130 days; 91, \$907.43 and \$974.93, 90 days; 100, \$1002.50, 50 days; 114, \$979, 25 days; 151, \$1185, 30 days; 153, \$1260.86, 30 days; 162, \$1014, 39 days; 164, \$1031, 40 days.

Class 17. Two cylinder facing machines—Bidder 50, \$320, commence 60 days; 57, \$294, 60 days; 91, \$293.46, 90 days.

Class 18. One driving wheel lathe—Bidder 109, \$6140, 185 days; 133, \$7130 and \$7270, 270 days.

Class 19. One engine lathe—Bidder 64, \$1670.36, 100 days; 100, \$1950, 90 days; 109, \$1998, 180 days.

Class 20. One engine lathe—Bidder 64, \$3270.29, 490 days; 91, \$2831.53, 240 days; 109, \$3400 and \$3530, 165 days; 151, \$2665 and \$2965, 165 days.

Class 21. One screw cutting lathe—Bidder 50, \$1135, 270 days; 64, \$1183.16 and \$1008.24, 460 days; 91, \$1180, 47, 210 days; 109, \$1598 and \$1098, 180 days; 151, \$1135, 90 days; 162, \$824, 75 days.

Class 22. Three screw cutting engine lathes—Bidder 50, \$1905 and \$2010, 120 days; 64, \$2117.10, 370 days, and \$1889.46, 160 days; 91, \$2127, 210 days; 109, \$2055, 180 days; 151, \$1980, 120 days.

Class 23. Three screw cutting engine lathes—Bidder 50, \$1455, 180 days, and \$1500, 120 days; 64, \$1373.40, 370 days, and \$1461.45, 190 days; 91, \$1452.18, 240 days; 109, \$1425, 220 days; 151, \$1410, 90 days.

Class 24. One tool room engine lathe—Bidder 91, \$765.48, 240 days.

Class 25. One cabinet turret brass lathe—Bidder 50, \$485, 60 days; 57, \$670, 110 days; 91, \$777.81 and \$644, 150 days.

Class 26. One turret lathe—Bidder 77, \$1750, 140 days; 91, \$2791.75, 240 days.

Class 27. One hydrostatic wheel press—Bidder 24, \$2250, 135 days; 91, \$1923 and \$1374.50, 150 days; 109, \$1890, 180 days; 123, \$1978, 98 days; 128, \$1925, 112 days; 151, \$2115, 90 days.

Class 28. One hydrostatic beam and angle bending machine—Bidder 24, \$2725, 135 days, and \$1790, 105 days; 109, \$2160, 200 days; 128, \$2970, 84 days.

Class 29. One flue welding machine—Bidder 50, \$555, 60 days; 57, \$585, 52 days; 91, \$567.21, 90 days; 100, \$685, 50 days; 129, \$363, shpt. 1 day; 162, \$574, 55 days.

Class 30. One rotary splitting shear—Bidder 57, \$1950, 85 days; 91, \$1384.85, 90 days; 129, \$1374, shpt. 1 day.

Class 31. One single punch—Bidder 91, \$522.10, 120 days; 100, \$365 and \$634.75, 120 days; 109, \$520, 165 days;

123, \$405, 75 days; 129, \$298, shpt. 30 days; 151, \$365, 135 days; 162, \$396, 75 days.

Class 32. One steam pump—Bidder 24, \$825 and \$475, 110 days; 45, \$496.15 and \$517, shpt. 63 days; 49, \$990 and \$1030, 50 days; 91, \$439.10, 120 days; 100, \$411.75, 90 days; 128, \$698.50, 70 days; 142, \$935, 90 days; 164, \$945, 70 days.

Class 50. Six pneumatic geared hoists—Bidder 29, \$1465; 31, \$1710; 74, \$832.50; 91, \$1463; 121, \$1305; 162, \$1358.

Class 51. Thirty-four jacks—Bidder 54, \$1127.50; 100, \$1411.70.

Under bids opened April 23 for supplies for the navy yards, the Warren Steam Pump Company, New York, has been awarded class 81, one vacuum pump, \$290.

Catalogues Wanted.—The Bennett Engineering & Steam Specialty Company, Cleveland, Ohio, is revising its catalogue files, and will be pleased to receive catalogues from manufacturers of machinery, supplies, power equipment, engine room specialties and heavy hardware.

Trade Publications.

Mine Car Hitchings.—Wm. Harris & Son, Pittsburgh, Pa. Catalogue A. Gives an illustrated description of the company's standard double clevis hitching, Jumbo double clevis hitching, five-link hitching, hook and clevis hitching, hitching with bridges on clevises, three-link coupling, single-link coupling for center damper cars, special hook coupling, single clevis coupling, special handle pin hitching, and tail chains with rope sockets.

Machine Tools.—B. F. Barnes Company, Rockford, Ill. Catalogue. Size 6 x 9 in.; pages 88. Contains illustrations, descriptions and specifications of the following machine tools: 12, 14 and 20 in. upright drills, bench drills, stationary and sliding head drills, horizontal drills, gang drills (to which special attention is called and which are designed for the most rapid and economical production of multiple pieces of work); manufacturers' drill, stationery and sliding head gang drills, chucks, auxiliary heads, boring machines, compound tables, motor driven machines, lathes, grinders, key seaters, lathe tools, dogs, arbors, &c.

Compressors.—Ingersoll-Rand Company, 11 Broadway, New York City. Catalogue and pamphlet. Catalogue No. H-36. Size 6 x 9 in.; pages 64. Illustrates and describes a single line of air and gas compressors known as the type H, which are claimed to combine economy, convenience and reliability. They are duplex, steam driven, automatic machines mounted upon a single base and entirely contained. All possible combinations of steam and air cylinders are provided for in sizes ranging from below 10 to above 200 hp. Full lists of general dimensions, capacities and other desirable particulars are given. Pamphlet No. 35-D briefly describes several of the company's many classes of air and gas compressors.

Foot and Power Presses.—Ferracute Machine Company, Bridgeton, N. J. Temporary catalogue No. 15, superseding all previous catalogues. This refers to nearly 500 kinds and sizes of foot and power presses for working bar and sheet metals, paper, cloth and leather, showing some of the company's most recent designs. Illustrations, short descriptions, tables of prices, dimensions, &c., are given.

Iron and Steel.—Columbus Iron Store Company, Columbus, Ohio. Price-list. Covers standard iron and steel stock, including bars, plates, sheets, beams, channels, angles, &c., and ribbed and diamond pattern steel floor plates and high carbon steel angles. Tables of weights per lineal foot of round and square iron, steel angles, &c., are given. The company also handles refined iron in rounds, squares, flats and hexagons; open hearth and crucible steel castings; cold rolled strip steel; turned, ground and polished shafting, cold rolled rounds, flats and hexagons, springs, tool steel and emery and corundum wheels.

Flanged and Pressed Work.—Glasgow Iron Company, Pottstown, Pa. Catalogue. Size 5½ x 7¼ in.; pages 91. Cloth bound. This catalogue supersedes all previous ones, and illustrates and describes a few of the many types of the company's flanged and pressed work, such as boiler heads, manholes, flue holes, hand-holes, manhole saddles, boiler lugs, buckled plates, pipe flanges, &c. In large part it consists of useful information in the way of tables of maximum sizes and weights of materials, areas and circumferences of circles, weights of flat rolled steel per lineal foot, comparisons of standard gauges, &c., and including the Association of American Steel Manufacturers' standard specifications for structural steel and cast iron and special open hearth plate and rivet steel. A complete index to the contents of the book is appended.

Generators.—Crocker-Wheeler Company, Ampere, N. J. Bulletin No. 74. Devoted to engine type alternating current generators. A number of views are shown of generator installations in plants, the most notable of which is that in the California Gas & Electric Corporation, San Francisco, Cal., where three 4000 K. V. A. alternating current generators are installed. These are the largest generators ever built for gas engine drive. The bulletin also gives details of the design of the generators.

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HARDWARE

AT this season of the year there is usually doubt, hesitation and faltering because of the uncertainty of the harvest. This attitude of the business public forcibly illustrates the underlying intrinsic value of the crops of this country. Despite our immense growth in mining and manufacturing, we are, after all, an agricultural country so far as regards basic conditions. To those who have kept record of the past it is interesting to note that this same hesitation and doubt—carried sometimes to extreme pessimism—occurs regularly each year about this time with more or less virulency and exaggeration until the final determination of the crops in August. Then a wave of exceptional business with something of optimism is apt to succeed the former uncertainty and depression and carries matters along until the new year.

It is true that the outlook has some discouraging features, but much of this is probably more apparent than real, and the result in part at least of the natural depression which is experienced after a long period of unseasonable weather. A few days of sunshine will tend to lighten if not dispel this gloom and to put an entirely different face upon affairs. A great damage to the fruit crop is unquestioned, and there is also no doubt that the wheat crop has been injured to some extent—how much remains to be seen. The exaggerated stories in the newspapers, many of them manufactured for speculative purposes, must be taken with a liberal allowance of salt. The outcome of these damage rumors is rarely as great as is apprehended. The principal crop of the country, corn, is only being put into the ground, so any speculation regarding it is idle. While it is late it goes in under most favorable circumstances—an increased acreage and a very wet soil. From now on it is purely a question of weather.

There are also other hopeful and helpful features in the situation. The surplus reserves of grain and cotton in the country are larger than ever before and are taxing the efforts of the railroads to move them. Increased prices for farm products will mean a great benefit to the producer, with an enormous trade balance in our favor, since the Old World must have both our grain and our cotton and a constantly increasing volume of our manufactured products. At the same time the farming population of the country is in an exceedingly prosperous condition. Compared with former years the farmers are financially on Easy Street, feeling but little the burden of indebtedness, and in many cases having money to lend. Something of a failure in the crops, while diminishing the normal addition of the country's wealth, would on this account have far less effect on the market as a whole than in the bygone years, when such failure involved, in a measure, the impoverishment of the section affected. A similar well being with increased reserve resources characterizes the commercial, manufacturing and to some extent the laboring classes.

There are uncertainties, legislative and financial, prices are too high for permanent maintenance, and there is the possibility of the sudden and unexpected development of some disturbing influence, but the underlying conditions are sound and healthy. It is a time for conservatism, but not for depression or pessimism.

Condition of Trade.

Whatever be the outcome of the unseasonable weather so far as the crops are concerned, there is no doubt that it has interfered seriously with the current volume of business, causing the deferring of many purchases. This will unquestionably result in lessened sales of many articles, in accordance with the general principle that when goods or merchandise do not move freely at the regular time many purchases are deferred until another season. While the Hardware trade will not suffer on this account to anything like the same extent as some other branches, such as dry goods and clothing, many factories and stores will find that even with good general conditions the coming months will not quite make up for trade which may have been lost. The movement of Hardware, notwithstanding this influence, continues large with both the wholesale and retail houses, so that merchants have on the whole no ground for complaint. There is still a good deal of difficulty in getting orders executed at all promptly by the manufacturers of many leading lines, and even in the field of specialties many manufacturers are much behind their orders. There is, however, less complaint on this score than there has been for some time, and in most lines merchants who use a reasonable foresight are able to keep their stocks well assorted. Jobbers fortunately made provision for a large business, but notwithstanding this many of them are suffering from shortage in certain lines. There is little new in the matter of prices. The high cost of material and labor continues to affect quotations, and announcements of advances on important or minor lines are not infrequent. Many manufacturers recognize that when they are required to replenish their stock of material it will be at higher prices than was paid for what they are now working on, and this will probably call for a revision of their quotations. It is a matter for general congratulation that the quantity of goods going out of the country to foreign markets is constantly increasing. In this way a substantial advantage is secured by the manufacturers whose products are thus occupying foreign fields, and at the same time an important contribution is thus made to the commercial position of the country as a whole. There is much variety in the experience of the trade in regard to collections, some manufacturers and merchants finding little to complain of, while others report a good deal of sluggishness in this department. The condition of the crops is naturally the subject of much attention and some solicitude, especially as it is evident that the harvest will be in a measure disappointing as compared with the great crops of recent years. Higher prices may, however, go far to make up for any shortage that may be in the yield.

Chicago.

From week to week trade moves on with wonderful steadiness and force. Possibly it is a little quieter just now in some directions than it has been heretofore, but, if so, the slackening tendency is, all things considered, not of noteworthy moment. The most sanguine merchants, however, expect some falling off in volume of May business from the sales of the two preceding months. With the near approach of the summer season there should soon be, in accordance with established precedent, a sensible decline in demand, which, if it comes in a normal way and due to usual causes, will not prove disappointing either to the factories or jobbers. The movement of goods,

save in some of the Wire products, is of a seasonable nature and is not exceptional. A strong demand for Nails and Wire Netting is still experienced. Less complaint of delinquent deliveries from the factories is heard among the trade, though the difficulties incident to car shortage are still the source of annoying delays. Though unduly retarded by unseasonable weather the outing season is now at hand, and its opening is heralded by a lively demand for outdoor Sporting Goods. Fishing Tackle and Anglers' Outfits are now receiving chief attention, and trade in these lines is exceptionally good. Prices are on the whole apparently well maintained. Weather conditions, though generally much improved, are not yet wholly favorable, and in local territory especially have been distinctly adverse to trade development. Commenting on the tendency toward inclusion of Automobile Supplies in Hardware stocks, referred to in these columns last week, the principal jobbers are unanimous in the opinion that a very complete line of these goods will be necessary to supply the demand, which is rapidly growing. It is not expected that the heavier repair parts, such as Rubber tires, Chains and principal Engine parts will be carried, but there is a large and varied assortment of accessories which constitute a line that can be handled by the Hardware trade with profit. A number of the jobbing houses now carry a limited assortment of these goods, and in every case express satisfaction with results obtained and a purpose to gradually extend the scope of their efforts in this direction.

NOTES ON PRICES.

Wire Nails.—The mills still have a large volume of contract orders on which specifications are being freely received and shipments are still heavy. There is still a large amount of business being placed, but not in as large volume as earlier in the season. Some improvement is noticed in deliveries, owing, in part, to a more liberal supply in Steel and cars. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

In this connection the advance in freight rates, which goes into effect June 1, is to be noted, as it will affect slightly the cost of the goods in the territory concerned.

New York.—The nonreceipt of Nails, which jobbers have had ordered for some time, tends to keep their stocks poorly assorted. Three penny fine and 20-penny Nails have been particularly scarce. New York jobbers' quotations are: To retailers, carloads, on dock, \$2.19; less than carloads, on dock, \$2.33; small lots at store, \$2.30.

Chicago.—The steady stream of new business constantly flowing in prevents any material change in the Wire Nail situation. If any progress has been made by the mills in their race to overtake accumulating orders it is not yet noticeable in deliveries. Some betterment in car service is reported. Quotations are as follows: \$2.15 in car lots to jobbers and \$2.20 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—Much better deliveries are being made by the mills on back orders on account of the slackening off in new demand, and to a better supply of Steel and cars. Stocks of Nails at mills and in jobbers' warehouses continue light, but in the latter will soon be replenished, owing to more satisfactory shipments. All the Wire Nail mills still have large contracts on their books, against which buyers are specifying freely and shipments continue heavy. The tone of the market is firm, but prices are unchanged. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads, to jobbers.....	\$2.00
Carload lots, to retail merchants.....	2.05

Cut Nails.—New business is comparatively light, but shipments continue heavy in filling specifications on contract orders. The supply of steel is large and car service is better, resulting in more prompt deliveries. Mills not

seeking business are asking 5 cents premium per keg for prompt shipments. Other mills are adhering to current quotations for reasonably prompt deliveries, while still other mills are slightly shading regular quotations. Quotations are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads, to retailers, \$2.20. Iron Cut Nails at points west of and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

New York.—Manufacturers are not showing much improvement in making prompt shipments, but as local demand is not large, rather poorly assorted stocks do not inconvenience the trade as much as in the case of Wire Nails. New York jobbers' quotations are on the basis of \$2.30 for small lots at store.

Chicago.—No unusual activity is reported, though the demand is wholly satisfactory. Improved car service has in a measure resulted in prompter deliveries. Quotations are as follows: Iron Cut Nails, car lots, to jobbers, \$2.30; to retailers, \$2.35; Steel, to jobbers, in car lots, \$2.20; to retailers, \$2.25.

Pittsburgh.—The volume of new business continues somewhat light, but specifications against contracts are coming in freely and shipments by the mills are heavy. Consumers are now receiving better deliveries, owing to a larger supply of Steel and better car service, and are thus able to accumulate some stocks which have been very light for some time. Some mills are sold up for some time ahead, and are asking premiums of 5 cents per keg on prompt shipments, while other mills will make reasonably prompt deliveries at current prices, and in a few cases at slightly less than regular quotations, which are as follows, f.o.b. Pittsburgh: Carload lots, to jobbers, \$2.05; less than carloads, to jobbers, \$2.10; less than carloads, to retailers, \$2.20. Iron Cut Nails at points west and including Buffalo and Pittsburgh are held at 10 cents advance on Steel Cut Nails.

Barb Wire.—The cold and wet weather has been utilized in fence building, so that the consumption of Barb Wire has extended over a longer period than usual. Mill shipments continue heavy, filling specifications on contract orders. The market is firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.15	\$2.45
Retailers, carload lots.....	2.20	2.50
Retailers, less than carload lots.....	2.30	2.60

Chicago.—For this season of the year the demand for Barb Wire is rather phenomenal. Specifications are crowded forward without stint, and though the volume of new business has to some extent decreased, it is still beyond expectations for the season. We quote as follows: Jobbers, Chicago, car lots, Painted, \$2.30; Galvanized, \$2.60; to retailers, car lots, Painted, \$2.35; Galvanized, \$2.65; retailers, less than car lots, Painted, \$2.45; Galvanized, \$2.75; Staples, Bright, in car lots, \$2.25; Galvanized, \$2.55; car lots, to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Only a small amount of new tonnage is being entered owing to the lateness of the season, but specifications on contracts are still coming in freely and shipments by the mills are heavy. The Barb Wire market will likely continue quiet for some little time, as the season is about over. Prices are firm, but without change. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Gal.
Jobbers, carload lots.....	\$2.15	\$2.45
Retailers, carload lots.....	2.20	2.50
Retailers, less than carload lots.....	2.30	2.60

Smooth Fence Wire.—Weather conditions unfavorable for farm work have lengthened the time for putting up Wire Fencing, and manufacturers have a large volume of orders unfilled. The demand for Fence Wire thus continues in large volume, which the mills are doing their best to supply. The market is firm, and quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.85
Retailers, carloads.....	1.90

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base.	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Chicago.—From week to week, as the season advanced, the demand for Smooth Fence Wire has been expected to show a decline. Fence makers, however, are still crowded with unfilled orders and are insistent upon delivery of needed stock. Nevertheless conditions point to a quieter movement in the near future, which will enable the mills to resume normal promptness in filling orders. Quotations are as follows: In car lots, to jobbers, \$2, f.o.b. Chicago, and to retailers, \$2.05.

Pittsburgh.—The demand from Fence manufacturers is heavy, but the mills are making better deliveries owing to the larger supply of steel and better car service. The demand from this time forward will show a decline, as large consumers placed contracts some time ago, against which they are specifying freely. We quote f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.85
Retailers, carloads.....	1.90

Springs.—The prices for Wagon and Carriage Springs remain without important change, the market being characterized by a firm tone as a result of the high prices ruling for material and the excellent demand. There is, however, a disposition on the part of manufacturers, especially in the West, to change their terms, making the 10-day cash discount 1 per cent. instead of 2 per cent., as heretofore. The following revised extras have also been adopted, to go into effect June 1:

No.		
1	Cast Steel	6c per lb.
2	French Scroll and Platform Coach.....	3c " "
3	Springs, Two Plate.....	4c " "
4	Springs, 31 in. to 33 in. long, inclusive.....	1c " "
5	Springs, 28 in. to 30 in. long, inclusive.....	2c " "
6	Springs, less than 28 in. long.....	3c " "
7	Springs, made from 1½-in. Steel.....	2c " "
8	Springs, graded to and including No. 5 Steel.....	2c " "
9	Springs, graded to and including No. 6 Steel.....	3c " "
10	Brewster Top Springs and Victor Cross, without shackles	2c " "
11	No. 24½ Springs.....	3c " "
12	Springs, with Scroll or Curved ends.....	1c " "
13	Plates bent edgewise (for each bend).....	1c " "
14	One Plate Braces (not bent edgewise).....	1c " "
15	Springs, with Ribs.....	¼c " "
16	Longitudinal	1c " "
17	Springs, with more than one hole in center.....	¼c " "
18	Orders for less than five pair of a kind and size... 1c " "	
19	French Points.....	.50c per 100 lb.
20	Springs with Lips.....	1c per lip
21	Springs, with French Heads.....	.5c per head
22	Springs, with Riveted Plates.....	.20c per rivet
23	For Loop in Concord Spring.....	.10c per spring
24	Short Rib Bead.....	.2c per bead
25	Triple Springs.....	.50c each
26	Spring Jacks.....	.20c each
27	Open Head Rubber and Brass Bushed Round Nut, 1½ in. or less.....	\$1.50 per pair
28	Open Head, Steel or Fiber Bushed, Square Nut .....	.80 " "
29	Open Head, without Bushings, Square Nut.....	.25 " "
30	Open Head, without Bushings, Hexagon Nut.....	.30 " "
31	Open Head, without Bushings, Round Nut.....	.35 " "
32	Round Nuts	2½c each

Registers.—This is the quiet season with Register manufacturers and business is said to be rather dull just now, for the reason that the manufacturers by their good management brought it about that most of the larger orders were booked and deliveries were made unusually early in the year. This makes things especially quiet, as the trade stocked up in anticipation of advancing prices and few duplicate orders are coming in. Prospects are excellent for the resumption of activity in the summer.

Blacksmiths' Bellows.—Prices on Blacksmiths' Bellows are noticeably firm and quotations of some important manufacturers show considerable advances, amounting to something over 10 per cent. The market on Split Leather Bellows may now be represented in a general way by a discount of 60 and 10 to 65 per cent., and on Grain Leather by a discount of 50 to 50 and 10 per cent.

Cast Iron Hollow Ware.—Large handlers of Cast

Iron Hollow Ware report a good volume of business, but state that nearly all manufacturers are having trouble in getting sufficient raw material for their immediate requirements. Some of them, it is said, have had to pay premiums for needed deliveries. Under these circumstances prices are exceedingly firm, and it is declared that if there is any change it must be in the direction of higher quotations on finished products.

Wire Cloth.—Influenced partly no doubt by the backward season and partly by the results of the manufacturers' plan for marketing their product this season Wire Cloth seems to be rather quiet. The wholesale and retail trade are alike well supplied, and there is also said to be some accumulation of stock at the mills. While prices are not being shaded to any extent some makers are in the market for business and are somewhat active in soliciting orders, on which they state they can promise immediate shipment.

Sand Paper.—Some irregularity is observed in prices on Sand Paper. Competition for orders on the part of so-called outside manufacturers is increasingly keen, and low quotations are being reported. It is even stated that some manufacturers are making their quotations on the basis of the old list, which is considerably lower than the one now commonly accepted as standard. The associated manufacturers are said to be maintaining prices, but the condition of the market is believed to be rather unsatisfactory to them.

Wood Screws.—On account of the largely increased cost of the raw material, advanced prices on Brass and Bronze Screws are announced by the manufacturers. The new base discounts on these goods are as follows:

	Discount.
Flat Head Brass.....	.80 and 5 %
Round and Oval Head Brass.....	.77½ and 5 %
Flat Head Bronze.....	.75 and 5 %
Round and Oval Head Bronze.....	.72½ and 5 %
Flat Head Nickel Plated on Brass.....	.72½ and 5 %
Round and Oval Nickel Plated on Brass.....	.72½ and 5 %

The Screw market generally is in excellent condition, but the demand is such as to overtax the capacity of the manufacturers, who are much behind in the execution of their orders. No change has been made in the price of Iron or Steel Screws, but prices are firm and well maintained.

Cotton and Canvas Belting.—There is a considerable expansion in the consumption of Cotton and Canvas Belting and the sale of them is increasing not only with the agents and merchants making them a specialty, but particularly with the Hardware and supply trade. Hardwaremen, however, as a rule handle only the lighter widths and plies. A large quantity of these products are marketed direct by the producers to manufacturing consumers. The terms cotton and canvas as applied to Belting have in the past been used more or less synonymously, but at the present time the term cotton is applied more especially to the woven product, not stitched, while canvas or stitched canvas designates the other line. Some manufacturers produce several varieties, but many make a specialty of some particular branded product which is handled by the trade on the agency plan. The increased demand already referred to comes from the mill, mine and factory supply trade in general, as well as from Hardware merchants in the Middle West, North and Northwest who handle agricultural machinery for outdoor work on which this sort of Belting is used. In view of these conditions prices are naturally firm, with an advancing tendency, which is especially marked on account of the present high price of cotton. Prices on Leather and Rubber Belting are also on a very high level, due to the cost of raw material, and it is remarked by several manufacturers that this has led to increased consumption of Cotton and Canvas lines.

Asbestos.—There has been no appreciable advance in the price of manufactured Asbestos Paper, Millboard, Packing, &c., since March, but the increase in the price of raw material at the mines is marked, present prices of high grade Asbestos Fiber costing as high as \$350 per ton, which is almost double that of a year or more ago. The reason assigned for the various advances more re-

cently made and the present high prices is the greatly increased demand for articles composed wholly or in part of Asbestos. For instance, in building enterprises where various felts and papers of inflammable character have been commonly used, boards of fire underwriters have specified Asbestos Paper, Board, &c., in the construction of slow burning structures, to avoid penalties in fire insurance. Some of the mines have been closed down, we are advised, which has likewise had a tendency to harden the market for raw material, while the constant widening of the field for products requiring Asbestos as a constituent have all tended to enhance the price.

Copper Products.—Prices for materials composed entire or in part of Copper, including Brass, in sheets, rods, wire, tubes and kindred staples, show little if any change, the market being of a waiting character. Users of Copper and Brass materials are buying for current needs only.

Stillson Wrenches.—The Walworth Mfg. Company, Boston, Mass., has been obliged to advance the price of the genuine Stillson Wrench owing to the increased cost of steel and labor. The advance, however, is not as much as justified by the increased cost of production, as owing to the many imitations of the Wrench on the market the company did not deem it advisable to put the price as high as market conditions warrant. The company has also changed its cash discount on the goods from 1 per cent. to 2 per cent., 10 days, thus making all its lines uniform in this respect.

Tacks.—There is a tendency to higher prices in some kinds of Tacks, and an advance under date of May 24 was made by the Atlas Tack Company. Upholsterers' Tacks formerly 90 and 40 per cent. discount from list are now 90 and 35 per cent. off to the retail trade, and Cut and Carpet Tacks previously 90 and 30 per cent. discount are now 90 and 25 per cent. off, these discounts being subject to the same extras as heretofore. The advance so far does not apply to the entire line, but some special goods, not listed and sold in 100-lb. kegs, have been moved up from 20 to 30 cents per keg. Among the reasons given for the increase are the higher costs of freight on raw material.

Shovels.—On the whole the market for Shovels may be said to be fairly firm, although there are a few manufacturers who are making comparatively low prices. Strength is imparted to the market by the high price of raw material and by difficulty in securing adequate supplies as well as by the demand, which is said to be in excellent volume. The prices of the constituent companies of the Ames Shovel & Tool Company are well maintained at a level somewhat above those of the independent producers. Many of the latter, however, are said to be maintaining figures on competitive grades somewhat higher than in the early spring. Some conferences among them have been held which are believed to have led to this improved condition of affairs, although it is understood that there is no formal organization or agreement between them.

Rope.—The market continues in much the same condition as for the past month. Demand is fairly good, but not up to the capacity of manufacturers' plants. Card prices remain unchanged, but in the lower grades of Rope there are some variations, to which the following quotations are subject: Pure Manila, 13 to 13½ cents; B quality, 12 to 12½ cents. Pure Sisal, 9¼ cents; No. 2 quality, 7¾ to 8 cents; No. 1 Jute, ¼ in. and up, 9 cents; No. 2 Jute, 8½ cents.

Window Glass.—Conditions in the Glass trade are looking somewhat more encouraging, and manufacturers are more hopeful of the future. A number of the hand operated factories will go out of commission by June 1, and with warmer weather the output of those remaining active will not affect the market to any great extent. Inquiries are being received by manufacturers, and jobbers are doing something toward sorting up their stocks. Spring demand is apt to be disappointing, and the irregularity of market since March has helped to make it more so. Some look for a revival of buying in July. According to reports, manufacturers representing about

2000 hand operated pot capacity have agreed not to commence operations in the Fall until they are assured that the workmen will live up to their agreements. This determination will probably result in a late start of the factories. Locally, demand is only moderate. Minimum prices recommended by the Eastern Window Glass Jobbers' Association are as follows: Jobbers' quotations from jobbers' list October 1, 1903, Greater New York, 90 and 10 per cent. discount on all sizes, single and double strength. Outside of Greater New York, in the Eastern District, prices are not uniform, ranging from 90 and 5 for single and 90 and 10 per cent. discount for double, to 90 and 15 for single, and 90 and 20 per cent. discount for double, according to location of territory. Minimum prices recommended by the Western Window Glass Jobbers' Association are as follows: Jobbers' quotations from jobbers' list October 1, 1903: 90 and 10 per cent. for single and 90 and 15 per cent. discount for double strength Glass.

Linseed Oil.—Business continues light, small withdrawals on contracts and but light demand for jobbing lots characterizing the condition of the market. Foreign demand for Flax Seed sustains the price of Seed, and Oil would probably advance in price if the demand for it increased to any extent. Some in the trade do not look for a revival of buying before July. New York quotations for jobbing lots are as follows, according to quantity: City Raw, 44 to 45 cents per gallon; Out of Town Raw, 42 to 43 cents per gallon, according to seller. Boiled Oil is 1 cent a gallon over Raw.

Spirits Turpentine.—Trade has been quiet during the present week at this point, with jobbing lots firm in price at former quotations. New York quotations are as follows, according to quantity: Oil Barrels, 63½ to 64 cents; Machine Made Barrels, 64 to 64½ cents per gallon.

ARKANSAS HARDWARE ASSOCIATION.

THE formal programme for the eighth annual convention of the Arkansas Retail Hardware Association, Chas. E. Taylor, Little Rock, secretary, indicates that the proceedings at Little Rock will be of an interesting and instructive character, while the entertainment side has also received more than adequate attention. Among practical papers which will be read during the three days' sessions will be the following: "Needed Legislation," by R. F. Roys, Russellville; "Freight Rates," by J. D. Mays, Helena; "A Lifetime in the Hardware Business in Arkansas," by C. T. Rosenthal, Batesville; "How to Take Inventory," by J. B. Hurley, Warren; "A Neglected Line in Arkansas—The Vehicle and Implement Business," by Geo. L. Turner of the St. Louis house of the John Deere Plow Company. A practical talk on "Window Dressing" will also be given by A. V. Walker of Bracy Bros. Hardware Company, Little Rock, a house which gives much attention to the effective arrangement of its window space. Another address will be that by Geo. Russ Brown, secretary of the Little Rock Board of Trade, whose topic will be "Why Our Business Men Should Recognize the Resources and Possibilities of Arkansas." As usual, the Question Box will be a prominent feature. It will be under the efficient charge of Hamp Williams of Hot Springs. Quite a number of questions are suggested by the programme, but others will be welcome, as it is intended to give as much time as possible to the discussion of such topics as are submitted.

The leading entertainment features are afternoon automobile and trolley rides for the ladies, a theatrical performance, a baseball game and a smoker. The latter will be tendered by the Simmons Hardware Company of St. Louis, and during the evening John Hall, the company's sales manager for foreign countries, will deliver an entertaining address on "Hardware Trade in Foreign Countries," his remarks being accompanied by stereopticon views.

On the parlor floor of the Marion will be a number of exhibits of Hardware and kindred goods, ample time for the inspection of which between the convention sessions has been provided.

Hardware Window Display

EIGHTH ARTICLE.

IN the last article of this series some attempt was made to show how space afforded by a show window may be used to best advantage. A number of stands or platforms constructed for use in the window from time to time were illustrated. As a rule no attempt is made to construct stands with any particular care, as they are usually covered with some sort of material, the color of which will contribute to the attractiveness of the window.

Plain Colors Should Be Used

for background in all cases, as they are in better taste and goods show up more prominently against them, just as in decorating a house pictures are much more effective on plain colored wall paper. Fig. 24 illustrates another

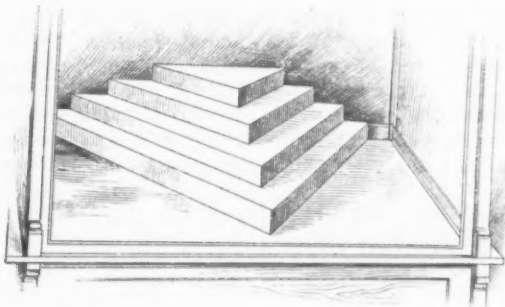


Fig. 24.—Stepped Display Stand Dividing a Window.

form of display stand which may be used in the window from time to time. This, it will be seen, comes to a point in the center of the window and in effect divides it, so that one side can be used for one article or line and the other side for something different.

Cardboard Hogs, Sheep and Steers.

In Fig. 25 is suggested an original and decidedly effective way of displaying Butchers' Cutlery. The porker is made of heavy cardboard with easel back, and the Butcher Knife is attached by two wire loops run through the body of the animal and twisted together on the back. The price of the Knife may be painted or stenciled, as

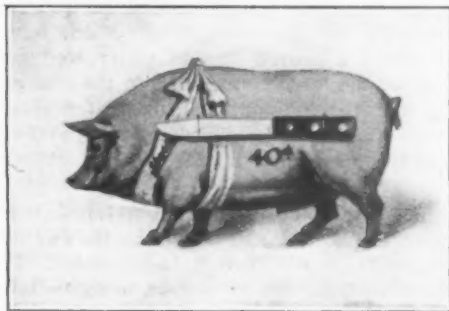


Fig. 25.—A Unique Butcher Knife Display.

indicated. This idea is original with Robeson Cutlery Company, Rochester, N. Y., using as its trademark "Shur-edge"; which has been furnishing hogs, steers and sheep like the one illustrated to its customers for use in featuring its line. The animals may be displayed singly or in droves, according to the ingenuity of the window dresser. At the recent convention of the New York State Retail Hardware Association at Syracuse the company had a display in one of the local store windows in which several animals of each kind were grouped together, each one bearing a Knife to sell at a different price, the figures being marked plainly as in the illustration. The hogs were 18 in. long and 9½ in. high; the steers, 26 in. long and 17 in. high, and the sheep, 21 in. long and 12 in. high. About 16 of these figures will pretty well occupy a window floor containing 25 or 30 sq. ft. Of course, they can be grouped together or spread out to suit any space.

Such an exhibit is one which could hardly fail to amuse or attract the attention of passersby.

Recreation Goods.

Hardware merchants who pay more or less attention to Sporting Goods find in the lines embraced by this classification an incentive to special effort in window dressing. Displays of Sporting Goods are peculiarly calculated to produce tangible results in the way of increased sales, because they are seasonable lines and may be featured at a time when the consuming public are simultaneously interested. It is also distinctly recognized that Sporting Goods interest and attract a large public, because they suggest pleasure and entertainment which the majority of people enjoy even if they have little opportunity to participate in them. There is admittedly no class of customers who are more enthusiastic over their paraphernalia than sportsmen, and any amount of trouble and expense in displaying this class of goods will be amply repaid if the best trade can be secured.

(To be continued.)

THE well-known and long established business of I. E. Palmer, Middletown, Conn., has been incorporated under Connecticut laws as the I. E. Palmer Company, with capital stock of \$500,000. I. E. Palmer, who has conducted the business for 48 years under his own name, is president and treasurer of the company; Townsend Palmer is vice-president, and F. E. Fowler, secretary and assistant treasurer. The history of this business is an unusual one, in that the company has been consistently a pioneer in its line for many years. The Palmer Hammocks have come to have a world-wide reputation, and the same is true of the Hammock accessories, which have been developed in connection with the line. The company also manufactures Mosquito Nettings and Canopies, Window Screen Cloth and Crinoline Dress Linings.

WALTER W. BIRGE will become secretary and sales manager of Fayette R. Plumb, Inc., Philadelphia, July 1. Mr. Birge formerly had charge of the sales of the St. Louis Shovel Company's plant of the Ames Shovel & Tool Company, and in this capacity was particularly familiar with the territory between Chicago and St. Louis on the East, and Denver. Mr. Birge will look after this territory in the future in the interest of the Plumb products and will be assisted by Joseph H. Plumb, a brother of Fayette R. Plumb, and by James E. Terry, a salesman who has been in the employ of the company for a number of years. In this new departure Mr. Birge, who is well and favorably known, will have the best wishes of the trade for his success.

A VALUABLE booklet entitled "A Lesson in Manual Training" has lately been prepared and issued by George H. Bishop & Co., Saw manufacturers, Lawrenceburg, Ind. It is especially designed for the instruction of boys in manual training schools. In its 16 pages the pamphlet presents a good deal of matter of practical interest and value to beginners in the employment of tools, touching on the use of Hand Saws, Rip Saws, Crosscut Saws and Back Saws, and how to file Saw teeth. It also suggests an exercise for practice and enumerates a number of "Don'ts" for teachers to observe. This concern has for years made a careful study of manual training requirements and will be pleased to send copies of the booklet to any interested on application.

THE PICKETT HARDWARE COMPANY, 414-416 Pennsylvania avenue, Warren, Pa., has enlarged its premises by taking in the store at No. 412, which will increase facilities about one-half. The new store will be devoted to warehouse purposes. The company intends taking up some new lines.

Welton Stanford has succeeded the Hardware firm of Teller & Stanford, in Schenectady, N. Y., E. C. Teller having retired. Mr. Stanford will continue to conduct the business at the same location.

G. C. Whisler has opened a new Hardware, Stove and Tinware store at Cameron, Mo.

SUBSTITUTION OF GOODS SPECIFIED IN CONTRACT.

A CASE of some general interest has been decided by the Supreme Court of the State of New York. A suit was brought by a contractor to recover for work done, but was defended on the ground of failure to obey the specifications. Samson Spot Braided Cotton Sash Cord was specified, but not used. The contractor testified that he did not know it, but used another which he considered good. The architect testified that the cord used was not durable and not equal to that called for in the specification. The court ruled as follows:

The contract was not substantially performed in all respects, and there is no evidence to support the finding of the trial court that it was. There is no substantial performance when no attempt is made to comply with certain express requirements of the specifications and no excuse or explanation is given for the failure. A contract is not substantially performed by substituting for that which is expressly required materials, methods of workmanship which in the opinion of the contractor and his experts are "just as good," unless the substitution relates to a matter of minor importance, is made in good faith and for sufficient reasons, and there is an adequate allowance for the difference. The owner has a right to what the contractor agreed to give him, and unless he has it or, when the failure is neither willful nor substantial, is fully compensated for the omission, there is no substantial performance and there can be no recovery. It is not sufficient for the contractor to build a house, but he must build the house contracted for and substantially comply with the specifications as to the method of construction, materials and workmanship before he is entitled to payment.

In the case last cited we said: "The contractor may not deliberately violate his contract by the use of earthen construction instead of iron and small pipes instead of large ones, and yet claim that he has done as he agreed because the result is just as good. Unless the owner had the right to contract for what he wanted and to get what he contracted for, there is no use in making the contract. A building contract, like any other, is to be fairly performed according to its terms, and any substantial change, unless authorized by the owner or architect, is made at the risk of the contractor. In order to avoid injustice the law tolerates unsubstantial deviations made in good faith, but it exacts full compensation therefor and permits a recovery on the theory of substantial performance only after the proper deductions have been made. The contractor had no right to substitute his own judgment for the stipulations of the contract, or to recover on the basis of complete performance, when . . . he willfully and intentionally used inferior and less expensive materials in the place of those agreed upon."

CHANGE IN FREIGHT RATES.

IN pursuance of a general change, which the railroad companies propose to make in rates, on and after June 1, 1907, all rates on Nails, Wire, Horse Shoes, Bars, Plates and Structural Steel to Central Freight Association territory, namely, points east of the Mississippi River, north of the Ohio River and west of Buffalo, N. Y., Erie and Pittsburgh, Pa., Wheeling, Charleston and Parkersburg, W. Va., will be increased to fourth class, less than carload, and fifth class, carloads. To trunk line territory, namely, points east of Buffalo, N. Y., Erie, Pittsburgh, Pa., Wheeling, Charleston and Parkersburg, W. Va., and north of "Virginia cities," new rates on Nails, Wire, Horse Shoes, Bars, Plates and Structural Steel will be increased approximately 1½ cents per hundred pounds carloads and less carloads above the present rates. The rates from Pittsburgh to points west of the Mississippi River on above commodities will, in most instances, be increased 2 cents per 100 pounds, both carloads and less than carloads, except to Arkansas, Indian and Oklahoma Territories, Texas, Arizona and New Mexico, in which territory we have not received information as to the basis for construction of new rates.

In line with the effort now making by manufacturers to post merchants concerning the selling points of their goods—material, construction, advantages, &c.—the Columbian Hardware Company, Cleveland, Ohio, has lately issued a valuable booklet under the significant title "The Book of Reasons." It is addressed to the consumer, the merchant and the retail salesman, with the assurance that "it is just as important to know the 'why' of the goods you handle as the price." The contents of the booklet, it is said, were originally used to instruct the company's traveling force. The little volume consists of

24 pages and presents in an interesting and concise form the talking points in regard to Columbian Hardware, including an extensive assortment of Hinges, Door Springs, Screen Door Sets, Coat and Hat Hooks, Ceiling Hooks, Registers, Vises, Anvils, Joist Hangers, &c. In connection with the text a number of illustrations are given to enforce and render clear the points made. The booklet admirably fills the purpose for which it is issued and will doubtless be found useful and instructive by those for whom it is intended and incidentally advantageous to the company in increasing sales of its products, as a result of the better understanding of their special features and merits.

ERRORS IN THE IRON AGE DIRECTORY.

THE great care given to the compilation of *The Iron Age Directory* has resulted in making the volume exceptionally accurate and complete with exceedingly few omissions or errors. Our attention has been called to one or two mistakes, however, in the 1907 edition, recently distributed. One of these had to do with the well-known Saw manufacturers, E. C. Atkins & Co., Indianapolis, Ind., who through a blunder in our printing department were omitted under the head of Hack Saws. We trust our readers will bear them in mind when having occasion to look up manufacturers in this line.

Our readers also will please to note that the address of S. B. Martin as given in the current edition of the Directory is in error. Mr. Martin is located at Dalton, Ohio, and not at Dayton, as printed. His manufactures are classified under the headings, Hangers, Barn Door, and Ladders, Rolling Store. Mr. Martin's Ladder is designed for use in stores where goods are carried on shelving and where it is desired to convey heavy boxes, kegs, &c., from one end of the store to another. The Ladder is termed the "Low Down High" Store Ladder, which is intended to imply that the conveyor and stepladder are combined in one. The Ladder is alluded to as being convenient and easy to operate, and as being available for a large range of work.

OLIVER BROS. PURCHASING COMPANY, 127 Duane street, New York, whose Pittsburgh office, under the management of George Piper, has been located on the sixteenth floor of the Frick Annex Building, has moved that office to larger quarters on the sixth floor of the same building. The change affords needed room for taking care of the firm's increasing business as well as better accommodation for the office force, which has almost doubled within a year. Located under the same roof with many of the largest companies in the iron and steel industry, the company offers convenient headquarters to its clients visiting Pittsburgh, including a well equipped bureau of trade information.

THE business of Charles Morrill, 277 Broadway, New York, has been incorporated under the laws of the State of New York as Charles Morrill, Incorporated. The business will be continued as heretofore, using the same patent rights, trade names and trademarks. The line manufactured in the past has been principally Saw Sets, Punches, Bench Stops, Seal Presses, Cutting Nippers, Tweezers, Nail Pullers and Spike Pullers, but in the future, in addition to these articles, a general broadening is contemplated. The parties interested are the same as heretofore and the management will continue as for the past 10 years. The officers of the new company are: William C. Morrill, president; S. C. Morrill, treasurer, and J. A. Hurdle, secretary.

THE TROUT HARDWARE COMPANY, Chicago, which was some weeks ago forced by financial difficulties to place its affairs in the hands of a creditors' committee headed by W. H. Bennett, has effected a settlement with its creditors and has resumed control of its business.

CLEVELAND FILLET COMPANY, Cleveland, Ohio, manufacturer of Crescent Wood and Leather Fillet, &c., announces that after June 1 it will be settled in its new factory building at 1444 East Forty-ninth street, that city.

PRICE-LISTS, CIRCULARS, Etc.

Manufacturers in Hardware and related lines are requested to send us copies of catalogues, price-lists, &c., for our Catalogue Department in New York; and at the same time to call attention to any new goods or additions to their lines, of which appropriate mention will be made, besides the brief reference to the catalogue or price-list in this column.

DECKER MFG. COMPANY, Keokuk, Iowa: Illustrated catalogue of Curry Combs, Hog Rings and Ringers, Bull Rings, Challenge Wire Stretchers, &c.

WM. CONNORS PAINT MFG. COMPANY, Troy, N. Y.: Budget of booklets and other printed matter, including price-list booklet, referring to American Seal Paints, White Lead, White Lead Putty, Cements, &c.

MARKS ADJUSTABLE CHAIR COMPANY, 50-52 East Twenty-ninth street, New York: "Solid Comfort," a booklet referring to the Marks Adjustable Chair; also booklet referring to Marks Adjustable Rocking and Reclining Chairs.

CLEVELAND FILLET COMPANY, Cleveland, Ohio: Illustrated catalogue and price-list of Crescent Wood and Leather Fillet, White Metal Pattern Letters, Fillet Tools and Pattern Makers' Supplies.

MARTIN-SENOUR COMPANY, Chicago: Attractive catalogue and price-list of Mixed Paints, Enamels, Stains, Fillers, Putty Colors in Oils, Varnishes, Coach Colors, &c., giving valuable information as to the uses to which different products are adapted, suggesting sample assortments, &c.

F. P. SMITH & Co., Sharon Hill, Pa.: "S. & C." trade bulletin for April, styled "Swine Jewelry Edition," referring to Hog Rings and Ringers and giving suggestions for the care of hogs.

RICHARDSON MFG. COMPANY, Bath, N. Y.: Illustrated catalogue No. 22, referring to an extensive line of House Furnishing Specialties and Supplies.

BURR'S DAMASCUS TOOL WORKS, Detroit, Mich.: Hand-some illustrated catalogue No. 12, with price-list, referring to an extensive line of Molders' Tools.

DELAWARE MARINE SUPPLY MFG. COMPANY, Wilmington, Del.: Illustrated catalogue and price-list No. 2, referring to Cast Brass and Bronze Hardware, including Fast Joint, Loose Joint and Loose Pin Butts, Strap, T and Scroll Hinges, Hasps, &c., Portlights, Marine Hardware, Car Trimmings and Ship Fittings, Hex Nuts, Condenser Tube Ferrules, Screw Eyes, Screw Machine Work, &c.

WILKINSON MFG. COMPANY, Binghamton, N. Y.: Illustrated catalogue, with accompanying price-list of children's Sleighs, Express Wagons, Automobiles, Velocipedes, Folding Tables, &c.

LEGGETT & BROTHER, 301 Pearl street, New York: Spray calendar for 1907-1908, giving valuable directions for applying dry and liquid sprays to many different kinds of fruit and vegetables, together with formulae, &c., and referring to Orchard and Potato Dusters.

F. N. PETER & BRO., Eagle Fence Works, Newside, Pa.: Illustrated catalogue of Steel, Wrought and Cast Iron Fencing, Railings, Fire Escapes, Window Guards, Cellar Grates, Mangers, Troughs, Tree Guards, general Scroll Work, &c.

MICHIGAN SPROCKET CHAIN COMPANY, Detroit, Mich.: Revised price-lists of Sprocket and Traction Wheels, issued under date of May 1, to replace pages in the company's general catalogue No. 5.

HORTON MFG. COMPANY, Ft. Wayne, Ind.: Illustrated catalogue referring to Horton Rotary, Horton Whirlpool, Globe, American and Western Washing Machines, repairs, parts, &c.

E. B. ADAMS & SON, Racine, Wis.: Illustrated catalogue No. 5 for 1907-1908, referring to an extensive line of Carriage, Wagon and Harness Hardware, Specialties, including Robes, Whips, Harness, Brushes, &c.

CHATTANOOGA IMPLEMENT & MFG. COMPANY, Chattanooga, Tenn.: Catalogue No. 17, with price-list, referring

to Southern Queen Combination Grates, Andirons, general foundry products, Royal Hay Presses, Pea Hullers, Disc Plows, Disc Harrows, Cultivators, &c.

WM. INGLIS WIRE & IRON WORKS, Detroit, Mich.: Elaborately illustrated catalogue referring to ornamental metal work, including Bank and Office Metal Fixtures, Elevator Inclosures and Cabs, and Grill Work in iron, brass and bronze.

NATIONAL RETAIL HARDWARE CONVENTION.

THE entertainment side of the National Retail Hardware convention at Boston, June 18-21, will be strongly emphasized. A committee consisting of delegates from each of the State associations, together with a larger membership from the New England and Connecticut associations and of representatives of 10 prominent factories, will see to the promotion of good fellowship. There will also be a committee of ladies, headed by Mrs. J. B. Hunter, Boston, wife of President Hunter of the New England Association. This committee will look after the entertainment of the visiting ladies while business sessions of the associations are in progress. The New England Association has always featured the attendance of ladies during its conventions, and this year the idea will be carried much farther than usual, plans calling for shopping parties, with a "department store luncheon," theater matinees and baseball parties. The general Entertainment Committee is arranging for an afternoon and evening at Wonderland, a large amusement park on Boston Harbor.

Mayor Fitzgerald of Boston will give an excursion on the municipal steamer to the penal institutions in Boston Harbor, and the opportunity will be open for a visit to the plant of the United Shoe Machinery Company at Beverly. A ladies' night banquet and a stag "Indian supper" will constitute other functions. The whole will be crowned by an excursion to New Britain, where the great Hardware factories will be inspected.

REQUESTS FOR CATALOGUES, &c.

The trade is given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate:

FROM MAHLMEISTER BROS., Dayton, Ohio, who carry a line of Shelf and Heavy Hardware, Cutlery, Tools and Paints.

FROM F. J. BORUM, formerly with the Simmons Hardware Company of St. Louis, who has opened a Hardware store at 675 Seventh street, Parkersburg, W. Va.

FROM THE O'NEIL HARDWARE COMPANY, a new house at 1050 Mt. Vernon avenue, Columbus, Ohio.

FROM LOGAN & WHALEY, Marshall, Texas, who have incorporated their Hardware, Stove, Implement and Sporting Goods business, with a capital stock of \$50,000.

FROM BONNELL & CHANDLER, Danville, Iowa, who have succeeded to the Hardware, Stove, Implement, Paint and Sporting Goods business of Shepherd & Bonnell.

FROM NATIONAL HARDWARE COMPANY of London, England, which has established a buying office in New York City at 32 Mercantile Exchange Building, and request price-lists and discounts on Heavy Hardware.

FROM FULTON MACHINE & VISE COMPANY, Lowville, N. Y., whose collection of catalogues and other trade literature was consumed in the fire on the 19th inst., which destroyed the company's shop, machinery and patterns.

APPLETON RETAIL MERCHANTS' ASSOCIATION.

THE Retail Merchants' Association established in Appleton, Wis., about a year ago has, we are advised, justified the expectations of those who were instrumental in forming the organization. Among other reforms brought about as a result of united action on the part of the city's retailers was the abolition of advertising in such unprofitable mediums as hotel registers, score cards, theater programmes, &c. With the success which has thus far attended their efforts, the officers of the association are just now considering the practicability of starting a credit bureau, the idea being to issue to the members a book containing the names of all patrons, together with their rating in the matter of credit. As of general interest to merchants, especially those who may be minded to inaugurate a movement of this sort in their own towns, we reproduce the constitution and by-laws of the Appleton Association below:

CONSTITUTION.

ARTICLE I.

This body shall be known as The Merchants' Association of Appleton, Wis., and is formed without capital stock, to advance the business interests of the merchants of the city of Appleton, to secure harmony among its members in carrying out this object, and also to promote the interests of the city of Appleton.

ARTICLE II.

The affairs of the association shall be managed by a board of nine directors, who shall be elected by ballot at the annual meeting of the association in each year, and shall hold office until their successors have been elected.

ARTICLE III.

The directors shall have power to make such rules and regulations as may be necessary to secure the objects stated in Article I of this constitution, and shall be governed by the by-laws hereinafter enacted.

These articles may be altered or amended by a majority vote at any annual meeting of the association, provided that written notice of the proposed alteration or amendment shall have been read at a previous meeting.

BY-LAWS.

ARTICLE I.—MEMBERS.

Sec. 1. The membership of this association shall be composed of such merchants doing business in the city of Appleton as shall have been elected to membership and have signed the constitution and by-laws.

Sec. 2. Any merchant doing business in the city of Appleton shall be eligible for membership. Those wishing to join shall make application, through the Committee on Membership, who shall submit the same to the next meeting of the association, and if on ballot not more than five votes are cast against the candidate he shall, on signing the constitution and by-laws, become a member.

Sec. 3. A member wishing to withdraw shall give written notice of his intention, through the same committee, and if there are no charges pending against him and the treasurer shall report him clear on the books his withdrawal shall take effect.

ARTICLE II.—OFFICERS AND COMMITTEES.

Sec. 1. The Board of Directors provided for in the constitution shall meet immediately after their election and shall elect from their number a president, vice-president, secretary and treasurer, who shall each hold office for one year and until their successors shall have been elected.

Sec. 2. These officers shall, between meetings of the association, constitute an executive committee to manage its affairs, subject to the approval of the full Board of Directors.

Sec. 3. The president shall, as early as practicable after his election, appoint the following standing committees—viz.:

1. A Committee on Membership, which shall receive and report on applications for membership and withdrawals.

2. An Advisory Committee of fifteen members, who shall, each, as fairly as possible, represent a different line of business, and of which the president shall be chairman.

3. A Committee on Appeals, through which a member who deems himself aggrieved by any decision of the Executive Committee may appeal to the association at a regular meeting.

4. A Committee on Finance, which shall have supervision of the receipts and expenditures of the association and shall report upon the same when called upon.

5. All committees, unless otherwise specified, shall consist of three members.

ARTICLE III.—MEETINGS.

Sec. 1. Regular meetings of the association shall be held on the third Friday in each month and an annual meeting shall be held on the third Friday of February in each year.

Sec. 2. The president may at any time, and on the written request of at least five members, call a special meeting, of which two days' notice shall be given, by mail, to each member, and at all regular and special meetings seven members shall constitute a quorum for the transaction of business, and the recognized

rules of order of parliamentary bodies shall be observed in all meetings.

ARTICLE IV.—FEES AND DUES.

The expenses of the association shall be met by an entrance fee of \$1 and regular dues of \$1 every six months from each member, and the same shall be payable in advance.

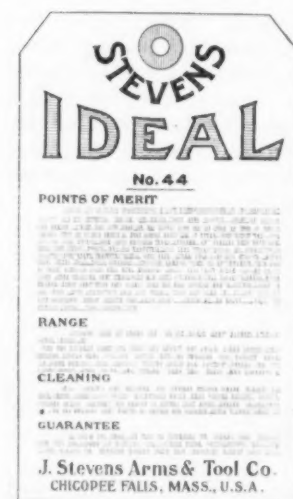
ARTICLE V.—ALTERATIONS.

These by-laws may be altered or amended at any regular meeting of the association by a majority of the members present, provided that such alterations or amendments shall have been submitted in writing at a previous meeting.

STEVENS READY REFERENCE TAGS.

WITH a view to familiarizing both the merchant and consumer with the exact uses of the many models comprised in its extensive and varied line, the

J. Stevens Arms & Tool Company, Chicopee Falls, Mass., is now attaching tags containing detailed information, points of merit, &c., to all of its Firearms. The tags are red in color, and 3½ in. wide and 6¼ in. high. The face of the tag, as reproduced herewith in reduced size, gives particulars under the head of points of merit, range, cleaning and guarantee. On the back of the tag are some pointers in regard to the proper care of the Arm, its weight, length of barrel, list price, together with blank spaces for noting the cost and selling price. It is, of course, obvious that the more a merchant and his



Stevens Ready Reference Tag,
Actual Size 3½ x 6¼ In.

clerks know about the goods they handle the better it is for the customer wishing information and in the market for a Firearm. On this account the Stevens tags will doubtless be appreciated by the trade as a move in the right direction.

THE trademark represented herewith is used by the Clark-Horrocks Company, Utica, N. Y., in connection with its product of Fishing Tackle. It will be observed that it is suggestive of the name of the city in which the goods thus branded are made. Just now the company is calling

attention to a prize advertising competition, which will close July 1. Relative to the contest a circular has been issued in which a number of pictorial advertising electrotypes are reproduced, which the company is prepared to loan to merchants for use in advertisements in their local papers. Cuts of the trademark will also be furnished, it being necessary to use either the trademark or pictorial electrotypes or both to make the advertisements eligible for the contest.

CLARENCE F. CHATFIELD, who for nine years past has been advertising manager for two of New York City's large department stores, has returned to the general advertising field, in which he was engaged before he took up retail advertising work for these stores. Mr. Chatfield came to New York 10 years ago from Owego, Tioga County, N. Y., where he had conducted an advertising bureau, and for a year was associated with Gillam & Shaughnessy, well known in the general advertising field. Mr. Chatfield has opened an office in the Mercantile Library Building, 13 Astor place, New York, and is prepared to furnish first-class copy, illustrations and plans for advertisers in all lines. With his extensive experience in this line of work he is well qualified to render efficient service. He will gladly explain his terms and methods of working upon request.

Export Trade Topics.

PRACTICAL SUGGESTIONS ON EXPORT TRADE.

Seventh Article.—FOREIGN DRAFTS.

FOREIGN drafts are usually "sold"—that is, discounted—in New York. There exists no good reason why every manufacturer doing an export business should not avail himself of this means of obtaining prompt cash for his foreign shipments and giving his foreign customers the benefit of his cash discounts, if so disposed. Many American manufacturers have a curious hesitation about discounting this sort of paper. Some of them, who do not wish to impose the hardship of requiring cash remittances by their customers, forward their documents to bankers for collection only, making no effort to discount them. Sometimes their customers, who are more familiar than they with the practice in foreign banking, object to the loss of cash discounts which are not allowed them, because they know that it would have been perfectly easy for the manufacturer to have cashed his draft in full in New York upon the sailing of the ship carrying the goods.

The explanation of the attitude of such manufacturers very likely lies in an imperfect comprehension of foreign banking methods, and particularly of the distinction between asking their home bank to discount their note and asking a foreign exchange banker to discount a foreign documentary draft. Frequently, doubtless, manufacturers fear to curtail their current banking loans or accommodations by discounting this other sort of paper. That fear is groundless.

Domestic Discounts Not Influenced by Foreign Drafts.

The foreign exchange banker usually knows nothing and cares less as to what outstanding domestic paper the manufacturer may be obligated for. It does not always matter whether the drawer of a foreign draft which it is desired to discount be known personally or through experience to the foreign banker. It is usually sufficient that his rating in Dun's or Bradstreet's books be satisfactory, although it would probably be better to be suitably introduced. In this case the banker does not inquire what other paper the manufacturer has outstanding. He is not in the least interested as to how the manufacturer's local bank account stands; not even as to how much other foreign exchange he may have discounted with other foreign bankers. He looks to the reported rating of the manufacturer, to the security offered by the bill of lading and the value of the goods, as shown by invoices and insurance certificate.

Some kinds of goods are regarded as less desirable security than others, and a foreign banker may restrict the amount of foreign exchange that he is himself willing to carry for a manufacturer in proportion to that manufacturer's reported means. But even then other foreign bankers are quite willing to take on any such surplus of bills, never asking how much banker No. 1 has outstanding. One export house in New York with a rating and an actual capital of only \$100,000 discounts \$100,000 worth of foreign drafts almost every week in the year.

Banker Amply Protected.

The basis of this business, then, is entirely different from the ordinary discounting operations with which the manufacturer may be more familiar. In "documentary" foreign drafts—that is, those accompanied by full sets of shipping documents—the foreign exchange banker not only has the drawer's signature and an agency rating of its value, but is further protected by the fact, as shown by experience, that probably nine-tenths (in value) of all foreign documentary drafts are duly or ultimately covered in full. He is protected by the security of the merchandise as represented by the bills of lading in his possession, retaining his property until the documents are given up. In case of total loss or partial damage he is protected by the insurance.

Hence even at the worst, if the banker is obliged to look to the goods because of default in payment by both drawee and drawer, the risk is reduced by such an amount as may be realized from a sale or other disposal of the goods, and does not in any case reach the total amount involved.

The custom of discounting foreign documentary drafts is indeed so common that the shipper who does not follow it is the rare exception. The business in consequence is an enormous one. There are a great many very large bankers in New York who handle nothing but foreign exchange, and some of them are reported to do as much occasionally as \$1,000,000 a day. Recently many of the regular banking institutions and trust companies have opened foreign exchange departments for the express purpose of catering to and taking care of this class of business.

Drafts Sold Subject to the Surrender

of the documents to consignee upon acceptance of the draft naturally receive a more careful scrutiny by bankers who are asked to buy (that is, discount) them. In this case the standing and reputation of the foreign drawee may be asked, but usually foreign exchange bankers know nothing about any but the very largest foreign merchants, and care little. Their recourse is on the drawer, the documents and the probabilities of the case.

It is seldom difficult for a well rated manufacturer to sell all the foreign bills he may desire, even if they are "documents for acceptance." It should be understood that foreign "draft" and "bill of exchange" are interchangeable terms, and that when "buying" or "selling" such drafts is spoken of, "discounting" is, perhaps, the more proper term, although the shipper suffers no loss in the operation. Bankers may, however, refuse to negotiate a bill, for example, because of the character of the market on which it is drawn, or because he has already a superfluity of bills on a certain market. But other bankers may be glad to get hold of precisely that bill.

Foreign Exchange Brokers.

Some houses doing a very large foreign business regularly employ a foreign exchange broker for the sole purpose of placing their drafts with foreign exchange bankers and securing the best available rates of exchange. Such brokers make a business of doing nothing else and usually receive a small fraction of 1 per cent. as commission. As rates of exchange fluctuate from day to day and also differ on the same day between bankers, dependent upon the supply of or desire for bills by each, their employment is an advantage by large shippers.

Although their intermediary may be avoided by small or occasional shippers, still the introduction that they can give to bankers and their advice to manufacturers is often of considerable value. Indeed, in the case of an out of town manufacturer who has no New York office, an arrangement with a reliable foreign exchange broker here would seem to be preferable to the alternative of passing his foreign bills through his local bank. The latter is usually a costly proceeding, as well as undesirable in ways that are sufficiently obvious.

How to Draw Foreign Drafts.

As a principle all foreign drafts ought to be drawn in sterling; that is, in English currency of pounds, shillings and pence. Exception may be made in the case of French or German bills, which may be drawn in the currency of those countries, and bills on certain parts of the world are sometimes drawn in "gold" dollars, as specifically distinguished from "trade" or any other sort of local dollar. But London is still the financial center of the world. It is the great clearing house for transactions between all the nations. The New York banker who buys a draft seldom forwards it direct to a corresponding bank in the place on which it is drawn. It is first sent to the New York banker's London house or correspondent and is there by them floated on the London exchange market, often very much as it was first floated by the manufacturer on the New York market, with the result that the

London bank who takes it ultimately forwards it to destination.

The rule should be never to draw in American money when it can be avoided. The manufacturer whose invoice amounts to \$500, for example, will in the end recover less than that amount if he draws for exactly \$500. Foreign exchange as well as banker's commission and interest must be taken into account besides corresponding bank's charges for collection, postage, certain foreign bill stamps, &c.

Before drawing a foreign draft it is usual to ascertain the day's rate of exchange in New York for sterling and for bills of the special character in question and then convert the amount or the invoice from dollars into pounds, shillings and pence, according to such ruling rate. The rate of exchange quoted in New York covers bank charges, interest, &c., hence if \$500 be converted into pounds sterling at the proper rate and the bill be then "discounted" at a New York banker's the shipper will or ought to receive a check for exactly \$500. His customer, the drawee, pays the charges involved and will make no objection, because perfectly familiar with this method of business, although he would be certain to protest were the bill drawn in dollars and the invoice value supplemented by bank charges; yet if this is not done the shipper realizes just so much less money than he has anticipated.

(To be continued.)

TRADE WITH THE PHILIPPINES.

THE letter given herewith comes to us from a manufacturer in this country, and is from a merchant in Manila, who is endeavoring to market American machinery and supplies in the Philippines as an agent there for leading American houses. Reference is thus made to some of the difficulties he encounters in seeking a market for American products:

Your circular letter of January 21 with enclosure of printed matter reaches me by mail of to-day.

Although well knowing the excellence of your Boats there will be no sale for them here, largely for the following reason: Congress has seen fit to impose a duty of 30 per cent. ad valorem on such Boats as you make. Before doing so it printed the proposed bill and mailed copies to prominent manufacturers, and also printed it in leading trade papers. The few protests from manufacturers were printed in the Senate Document covering the matter, and I note none from you or any other manufacturer of Boats. It appears then that you were perfectly willing to have your goods excluded from the Philippines by a prohibitive tariff, and I cannot quite see why now they are excluded by your own indifference, you ask me to attempt to sell them.

As Boats come by cubic measurement on vessels, 40 cu. ft. counting as a ton, the Boat being cubed up according to its largest dimensions, the freight is heavy, and would be a bad enough handicap without the addition of 30 per cent. duty.

In the above criticism of your lack of interest in Philippine matters, you are not alone as coming under it. Scarcely an American manufacturer has ever raised a finger to help make conditions such as to make his goods salable here. It seems to be "the Philippines be blanked" with you all when Congress has us on the grid-iron, and, later on, when Congress has us bound hand and foot we get letters from you gentlemen, saying: "Why the devil don't you sell more of our goods?" Funny, isn't it?

THE ATKINSON-WILLIAMS HARDWARE COMPANY, Fort Smith, Ark., wholesale Shelf and Heavy Hardware, Wagons, Buggies, Tinware, Stoves and Ranges, has just completed a new store building, 100 x 130 ft., four stories and basement, located at the corner of Fourth street and Rogers avenue. The stock and offices of the company are now being moved into the new quarters, which, being built especially for wholesale purposes, afford every needed facility in the handling of business.

NEVADA HARDWARE & SUPPLY COMPANY, Reno, Nev., has increased its capitalization from \$50,000 to \$500,000. The company now has about completed a new building of three stories and basement, 50 x 140 ft. in size.

TRADE ITEMS.

THE C. A. C. AXE COMPANY, Boston, Mass., represented by M. T. Christopher, 97-101 Warren street, New York, sales manager, is installing a gas making plant using anthracite coal. This action was necessary as the present demand for this Hand Made Chopping Axe covers approximately the product for the remainder of the year. The new plant, costing \$10,000, will supply enough gas to operate the works and heat the steel in welding, increasing the productive capacity, it is expected, a third. The company manufactures the Michigan Pattern Axe, Single and Double Bit and the Dayton Single Bit. The Axes are thin, tough and black finished and will, it is stated, stay sharp.

LONDON P. SMITH and other representatives of the American File Sharpener Company, 296 Broadway, N. Y., will be in attendance at the conventions of the Master Car Builders and the Master Mechanics, scheduled for Atlantic City, June 12-19, inclusive. Practical demonstrations in how to restore the cutting edges of Files, that apparently have been worn out, by the use of the File Sharpener made by this company will be given.

THE ARROW CAN COMPANY, 35 Warren street, New York, manufacturer of the Arrow Can for ashes, garbage and general use, has appointed Thos. Davidson Mfg. Company, Montreal, Canada, sole agent and manufacturer for Canada. New illustrated literature designed for both the domestic and Canadian market has just been issued.

THE WHITE LILY WASHER COMPANY, Davenport, Iowa, has changed its name to the White Lily Mfg. Company. The change was deemed desirable since in addition to the original line of Washing Machines and Gasoline Engines, the company has taken on and is now manufacturing several other articles. In all other respects the company is the same as before.

W. F. STEPHENSON has resigned his position as general sales manager of Belknap Hardware & Mfg. Company, Louisville, Ky., to accept the second vice-presidency of Barnes & Miller Hardware Company, Memphis, Tenn., to which position he was elected on May 4. Mr. Stephenson was formerly, for a number of years, connected with the Gray & Dudley Hardware Company, Nashville, Tenn. The Barnes & Miller Hardware Company succeeded the old house of Thomas, Barnes & Miller in November last and has since increased its capital, added to its facilities, taken on other lines and reached out into new territory.

PAUL E. DERRICK, publisher of "Derrick's British Report," London, England, will make his annual visit to America in June, to discuss with American manufacturers the practical problems connected with the placing of new brands of goods on the British markets, and for the betterment of trade in proprietary goods already introduced. His address during his stay will be care Hardware Club, Postal Telegraph Building, New York, June 1 to 5, and June 20 to 25; and Annex Hotel, Chicago, June 10 to 15.

THE MCCRUM-HOWELL COMPANY, 46 and 48 East Twentieth street, New York, announces it has determined that in the future the entire product of the company shall bear the general trade name, Richmond. Hereafter the trade will be furnished with Richmond Bollers, Richmond Radiators, Richmond Furnaces and Richmond Sanitary Enameled Ware. The company states that it will retain the name of Uniontown and apply it to the particular type of radiation with which that name has been identified in the past. It will also retain the names Acme, Corinth, Acme-Pin and Richmond-Wall, and apply them to those particular Radiators under which names the trade has known them heretofore. The entire Radiator family, however, will be known as Richmond Radiators. This decision was brought about through the belief that it would be easier for the trade and the public generally to concentrate attention upon the word Richmond than if the company retained a variety of trade names for its various products, and that the fusion of a single trade name with the firm's title will be more easily accomplished than if a greater number of names were employed.

A MANUFACTURER'S SAMPLE ROOM.

THE handsome office of the Corbin Cabinet Lock Company, 21 Warren street, New York, affords an example of an excellent method of displaying samples. In the palatial sample room shown in Fig. 1 the idea is in-

York, while the metal trimmings and embellishments are also the product of the company's plant, especially designed for the places they occupy. Selected walnut is used for the paneling, which is trimmed with dark oak, the pronounced grain of the latter affording just the needed contrast and finish. There are also several large



Fig. 1.—Sample Room of Corbin Cabinet Lock Company, New York City.

troduced on a large scale, but it could readily be adopted by retail merchants in displaying different classes of goods and smaller lines of samples.

The Room Itself,

as will be gathered from the photograph, merits extensive description. No pains or expense were spared in pro-

viding furnishings of the richest and most harmonious character. The woodwork was all made and set up in the company's own factory and shipped knocked down to New

leather panels handsomely carved and stained, one of which is shown in the picture behind the lounge built into the wall. This lounge is upholstered in leather to match the panel, as are the numerous easy chairs scattered about the room, while the massive oval table shown in the foreground of the picture is covered with a single hide.

Sample Boards.

An observer entering the room would hardly imagine that it contained any samples of goods—the handles or pulls on the sample boards which line the walls might easily be mistaken for ornaments. On drawing out one of the boards, however, as in Fig. 2, the system becomes entirely clear. Each board is attached by swivel hinges to a stout upright piece or base, which runs in a slide extending back into the wall. When the slide is pushed in the panel on the front of the board is flush with the wall and lines up with the other panels as shown in the cut. When pulled out the upright base is held steady and prevented from sagging by a stop bolt at the bottom, shown in the cut. The swivel hinges enable the operator to swing the sample board at will.

A feature of special convenience is the fact that the sample boards are constructed with a removable panel in the center on which articles are fastened. This makes it possible to release the panels by a turn of the buttons shown in the cut, so that a group of samples may be moved about at will or one set may be removed and another substituted without disturbing the fastenings. The padlocks shown in the cut are attached by locking them into brass screw eyes, while beside each lock there is a brass hook on which are hung the accompanying keys.

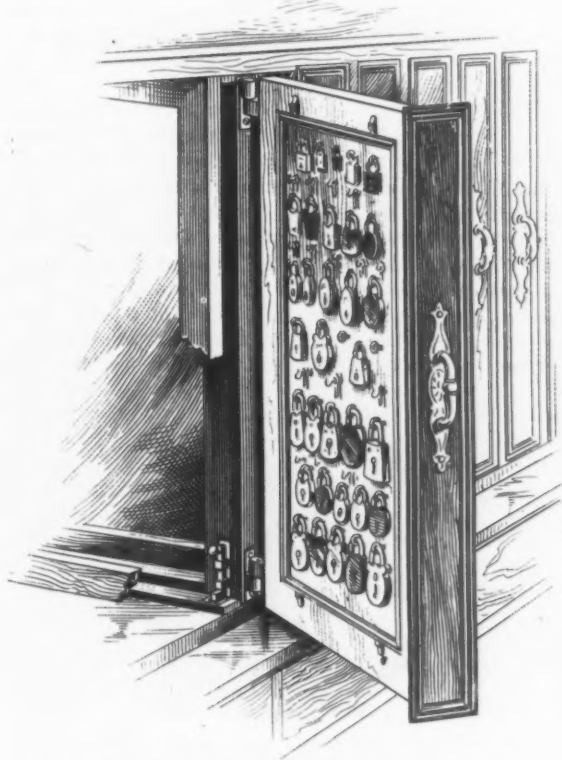


Fig. 2.—Method of Accommodating Samples.

viding furnishings of the richest and most harmonious character. The woodwork was all made and set up in the company's own factory and shipped knocked down to New

ALESSANDRO SQUADRILLE, Suorsola Cariatì 5, Corso Victor Emanuele, Naples, Italy, is intending to represent American manufacturers of Hardware lines in Italy, Austria, France, Germany and other European countries. Mr. Squadrille was formerly in the coral business, which he has sold out. We are informed that he is a well educated man of about 35 years of age, speaks English, German, French and Italian and is regarded as a practical business man.

CATALOGUE OF MORLEY-MURPHY HARDWARE COMPANY.

MORLEY-MURPHY HARDWARE COMPANY, Green Bay, Wis., has issued a new general catalogue, which it is distributing to its customers. The book is imposing in appearance, substantially bound and contains 1262 pages. It is divided into 14 comprehensive departments, as follows: Builders' Hardware; Miscellaneous Hardware; Agricultural and Construction Tools; Lanterns, Lamps and Oilers; Mechanics' Tools; Pipe Fittings, Hose, Belting, &c.; Paints, Oils, Varnishes, Brushes, &c.; House Furnishing Goods, Wooden Ware, Tinware, Stoves, &c.; Bolts, Screws, Heavy Hardware, &c.; Cutlery, Silverware, Clocks, Watches, Cut Glass, &c.; Fishing Tackle, Guns, Ammunition, &c.; Sporting Goods, Bicycles and Sundries and Saddlery Hardware and Harness. About half the books are bound, the remainder being of loose leaf character.

MISCELLANEOUS NOTES.

The Union Caliper Company.

The Union Caliper Company, Fitchburg, Mass., is manufacturing a line of spring dividers and outside and inside calipers. The dividers have springs constructed to fit the hand and prevent side deflection in the legs of the tool, and of ample strength to retain the position in which the tool is set. Nuts hardened to run smoothly are used on the outside calipers, and the screws have flat top thread, for strength and wearing qualities. The inside calipers have points which are of correct shape and properly matched.

Disston Chromol Hack Saw Blades.

Henry Disston & Sons, Philadelphia, Pa., are manufacturing Chromol hack saw blades, the special features of which are strength, maintenance of cutting edge and true cutting. The material in the blade possesses the peculiar qualities of high speed steel, making it specially adapted for blades to be used in cutting metal. The material takes the special hardening and tempering, so that the teeth of the blade will not crumble off, but is tough and strong and maintains its cutting edge for an unusually long period of time. The teeth are milled in, which gives a square cutting edge to the points, as well as the proper pitch or angle for cutting metal. In the blade the entire square cutting edge of the tooth comes in contact with the work, this being brought about by the manner in which it is toothed and by the improved method of setting the teeth, both of which insure rapid and true cutting. The company also makes milling cutters (saws) from the same class of steel as it uses for the hack saw blades.

Wright Wire Company.

Wright Wire Company, Worcester, Mass., manufacturer of an extensive line of wire and wire products, is now turning out of its No. 3 mill, at Palmer, Mass., large quantities of wire picture cord, a commodity which it added to its line not long ago. The company states that it intends to keep its output up to the highest possible standard, which it is in a position to do, since, unlike many manufacturers of picture cord, it draws its own wire.

Hill-Standard Wheels.

Hill-Standard Mfg. Company, Anderson, Ind., large user of wheels, has equipped a plant for the manufacture of steel and rubber tired wheels, such as are used for children's wagons, go-carts, baby carriages, &c. The method of manufacture is based on the principle of making all parts exact duplicates of each other, and making each part by a special machine made for that express purpose. For example, the tires are rolled in a special machine, and welded in a special electric welder; the holes in the rim are all made at one operation; the spokes all riveted at once, while the wheel is held in a

true position in a steel die. The steel die is so constructed that it is possible to put any desired tension on all spokes at once; a very desirable feature, insuring true running wheels, and wheels that will stay true as the tension is even on the spokes. At present the company makes a large variety of sizes and styles, and shortly will be prepared to make all the sizes common to the trade. Figs. 1 and 2 show the Hill tangent wheel, 12 in. in diameter, $\frac{1}{2}$ -in. rubber tire, 16 spokes of No. 12 wire, 7-16 x $2\frac{3}{4}$ in. hub. The wheel is particularly adapted for use on all children's vehicles that are self-propelled, or any wheel requiring a torsion on the hub. With the use of



Fig. 1.—Hill Tangent Wheel.

the tangent spoke wheel the tendency to break the spokes is entirely eliminated, as the torsion on the hub creates a direct tensile strain on half the spokes, and when the torsion comes in the opposite direction, this tensile strain is taken by the other half of the spokes. The spokes in the wheel shown in Figs. 1 and 2 cross each other, thus taking advantage of the tangent principle to the fullest extent possible. This wheel can be furnished with different sizes and styles of hubs, also steel or rubber tires of different sizes, and can be furnished enameled, tinned or galvanized. The wheel shown in Fig. 3 represents a 10-in. wheel, $\frac{1}{2}$ -in. rubber tire, 12 spokes of No. 12 wire, $\frac{3}{8}$ x $1\frac{1}{2}$ in. hub. This is the style wheel largely used on collapsible go-carts. The spokes of this wheel

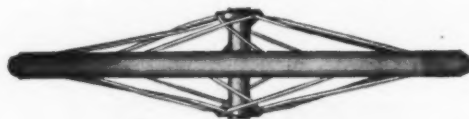


Fig. 2.—Side View of Tangent Wheel.

do not cross each other, yet the spokes are tangent. With this construction the tangent principle is not taken advantage of as fully as in the wheel shown in Figs. 1 and 2, but this wheel is designed for a different use, and for this particular service the tangent principle is not so essential, as there is no torsion on the hub of this wheel. This wheel should be strong enough to sustain a vertical load and the hub should be held firmly in position, so as



Fig. 3.—Rubber Tired Wheel.

to take a side strain; and for this service the wheel is particularly fitted. The stampings in this wheel are heavy, and for that reason the wheel will sustain a comparatively heavy vertical load. This construction of wheel is recommended for all service, such as boys' wagons, go-

carts and baby carriages. It can be furnished in various sizes and styles of hub, also steel or rubber tires of different sizes, and can be furnished enameled, tinned or galvanized. Figs. 4 and 5 show the detailed construction of the hub of different style wheels. The stampings are extra heavy and so constructed that they are wrapped firmly about the wire, making practically a homogeneous mass. The stampings can be changed so as to comply with the different services for which the wheels are in-

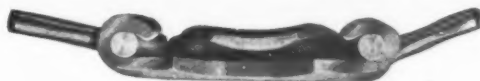


Fig. 4.—Detailed Construction of Hubs, Side View.

tended. The company is equipped to make all its stampings and every part entering into the manufacture of these wheels, and for this reason has absolute control of the output. This places the company in a position to supply the wants of customers, be they ever so large. The wheels, being made by patented and special machinery throughout, and each part being made a duplicate of each other similar part, gives, when finished, wheels of the same size and style that are exactly like each other wheel. The diameters of the wheels do not vary, this

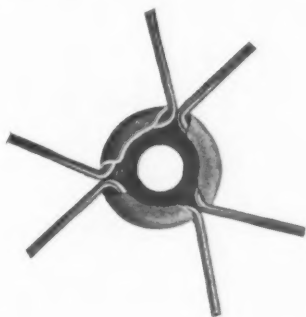


Fig. 5.—Detailed Construction of Hubs, Front View.

being a very strong feature, especially with the rubber tired wheel. When furnishing tires to renew old ones, these diameters being the same, there is no trouble about the new tires fitting the old wheel. The company has improved and patented special machinery for making and placing the rubber tires, and by this method each tire is made absolutely the same circumference, thus further carrying out the idea of making all parts duplicate. This standardization of rubber tires and wheels is a great convenience, especially where rubber tired wheels are used for hand cars, tricycles and foot and hand propelled vehicles, on which the wear on the rubber tire of the drive wheel is excessive, calling for a frequent renewal of rubber tires.

The Dana Food Chopper.

The Dana Mfg. Company, Cincinnati, Ohio, is offering the food chopper shown herewith. It is made with two



Fig. 1.—The Dana Food Chopper.

parts to clean, the rotor and shell. The rotor is removed by loosening the thumbscrew, which also holds the handle in place, leaving the shell open and free for cleaning. It is pointed out that no uncut food is left in the shell, and

that there is no drip or waste. There are three rotors, shown in Fig. 2, one each for meat, vegetables and for pulverizing various articles, including coffee. Among special features of the chopper the following are men-



Meat Rotor.



Vegetable Rotor.



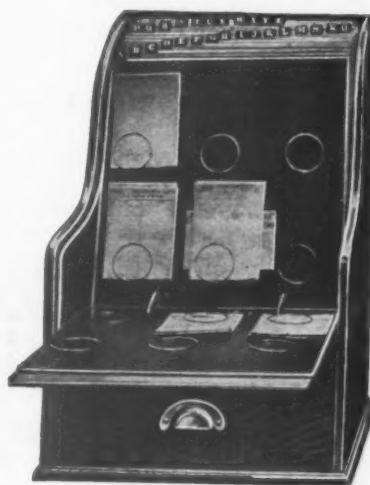
Pulverizing Rotor.

Fig. 2.—The Three Rotor Cutters.

tioned: That the improved cutting is due to the effective way in which the spirals on each rotor carry food to the cutter; that the cutters are self-sharpening; that the edges are always held in contact and that, since it cuts at an oblique angle instead of squarely, it is easy to operate and cannot break in operation. The chopper is made in three sizes: No. 20, weight $3\frac{3}{4}$ lb.; No. 40, $4\frac{3}{4}$ lb., and No. 60, 8 lb., the latter for restaurants, &c.

Huber Account Register.

The account register shown in the accompanying cut is made by the Huber Account Register Company, Buffalo, N. Y., which offers it in connection with an account keeping system which it has evolved. The cabinet is constructed of oak, with curved sides and paneled back, and is said to be finely finished throughout. The leaves



Huber Account Register.

which support the account slips are of carbonized leather pressboard, protected on four sides by metal binding. Aluminum leaves are furnished if desired. The springs which hold the charge slips are made of piano steel wire, and, it is claimed, will never lose their tension, which is even and strong at all points of contact with the charge slip, holding it firmly in an upright position. At the same time the spring can be easily raised with the finger tip for the purpose of filing additional slips. Each register is equipped with a removable metal index,

which may easily be arranged to accommodate an increase or decrease in number of accounts under any letter, an arrangement which makes the register self-indexing. Numerous advantages are claimed for the system in connection with which the register is used, among which are the following: It is a one writing system, requiring no bookkeeping; accounts are always up to date; it affords a positive method of limiting accounts; it prevents forgetting delinquent accounts; it reduces the number of disputes with customers; its name and record cards afford positive tabulated information, ready at any moment; its daily detail system sheets form a complete record of daily transactions. Several sizes are offered, according to the number of accounts which a merchant needs to keep. The entire cabinet, with its complete record, may be easily accommodated in the office safe, where it is protected against fire. The company will send full details of its system to any merchant on application.

Covert Stall Hitchers.

Covert Mfg. Company, Troy, N. Y., is placing on the market a stall hitching device which obviates the necessity of a manger, and permits the horse to feed off the floor and eat the hay with perfect freedom and safety. The rope is always taut, so that there is no danger of the animal getting his foot over the tie rope or strap. The accompanying illustration is broken away to show the interior construction. The pipe is 1 in. in diameter inside and is provided with caps at top and bottom, with two holes for attaching to a stall with bolts or screws. The top cap is fitted with a roller, over which a rope runs when the horse is moving about in the stall. The roller is kept in place by a 5-16-in. stove bolt, which can be easily replaced should occasion require. To the $\frac{3}{8}$ -in. cotton rope the company's No. 760 $\frac{3}{8}$ -in. jockey loop snaps are attached at each end, one to be fastened to the bridle or halter



Covert Stall Hitcher.

ring and the other to the weight which runs up and down inside the pipe. The weight weighs 1 lb., which is sufficiently heavy to take up slack rope. The whole fixture is japanned, giving it a nice, bright finish, and the snaps are X C plated. The total weight of the hitcher is 8 lb.

Combination Bathroom Novelties.

The Novelty Mfg. Company, Waterbury, Conn., is offering the trade some new designs in bathroom fittings. The two pieces here illustrated are a combination tub



Fig. 1.—Combination Tub Sponge and Soap Holder.



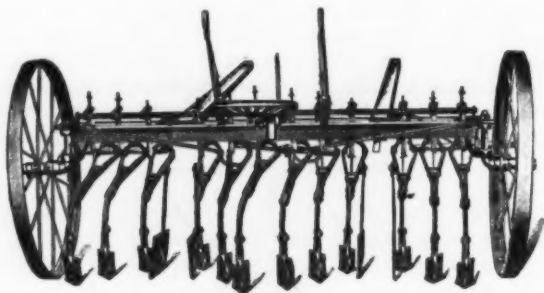
Fig. 2.—Combination Glass and Tooth Brush Holder.

sponge and soap holder (Fig. 1) and a combination glass and tooth brush holder (Fig. 2). The former is made of heavy solid brass wire, heavily nicked and highly finished. It has a depth of 12 in. and a width of 7 in. The

soap dish is placed below the sponge holder in this piece, thus preventing soapy water from falling on the sponge after the latter has been wrung out. The combination glass and tooth brush holder is also made of solid brass with a cast base and is heavily nicked and highly polished. It will hold six tooth brushes. The manufacturers state that this piece is made from extra stock and is very durable and substantial.

Improved Independent Two Row Riding Cultivator.

The riding cultivator shown in the accompanying cut is manufactured by the J. S. Rowell Mfg. Company, Beaver Dam, Wis. The cultivator is furnished with a spring seat and the spring pressure is independent on each shovel and bar, permitting light or heavy pressure, as desired. The wheels guide the beams, controlled by feet

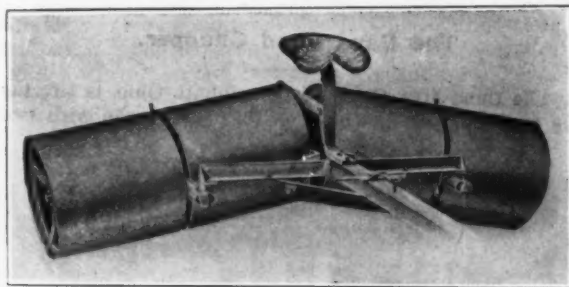


Improved Independent Two-Row Riding Cultivator.

on the levers. The pivot axle device is simple and strong, the wheels being locked to run straight when turning. Each bar being separate and independent from every other one and governed by itself, can be set anywhere on the frame, which is referred to as an improvement over shovels rigid on one beam. Center beams and shovels are furnished when ordered, to go in place of shields, to make a field cultivator.

The Dunham Flexible Land Roller.

J. W. Dunham & Son, Berea, Ohio, are offering the patented flexible land roller shown in the accompanying cut. The roller adjusts itself to all uneven ground, rolling a dead furrow and back furrow the same as on level ground. The bearings are about 6 in. long and are made of hard maple, making them similar to that of a car journal. This feature, together with the oil tube in each box, makes a journal, it is explained, that is positively dust



The Dunham Flexible Land Roller.

proof. The roller is constructed with open concave heads or solid steel heads. The roller is equipped with weight boxes in the rear and front of the machine to eliminate neck weight and the roller can be weighted as desired. The shaft projects beyond the machine but slightly, permitting rolling close to trees or fences. The seat can be taken off and set in the rear of the machine, if desired. This is referred to as a good feature when a boy is doing the rolling, as there is no danger of his falling under the machine.

Adjustable Pipe Lifter and Holder.

Davis-Hansen Company, Oshkosh, Wis., manufacture the Oshkosh patent adjustable pipe lifter and holder, shown in the accompanying illustration, as an aid in handling long lengths of pipe in vertical position such as is required in the piping and repairing of wells. The

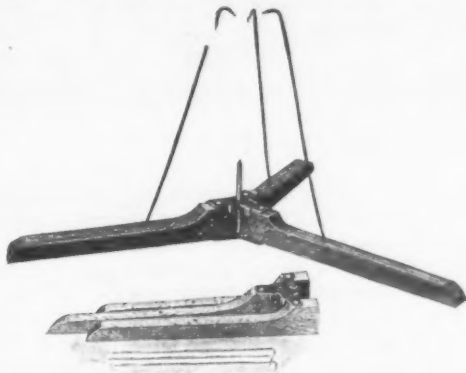


Adjustable Pipe Lifter and Holder.

tool consists of a pivoted lifting lever with a link grip and two cast iron pipe jaws mounted on a malleable cast base. The lifting link grips the pipe automatically when the lever is depressed and is likewise released when it is raised. After a lift is made and before the link is loosened the pipe is gripped by the jaws, which are tightened by pressure on the foot lever. The faces of the jaws are hollowed in the center to receive the pipe and engage at either side through a series of intermeshing rack teeth. The point of fulcrum on the lifting lever can be changed by loosening the set screw in the pivoted collar through which it passes and may be shortened or lengthened as desired. The tool is claimed to be not only serviceable and durable, but fast working and easy of operation.

Osborn Christmas Tree Holder.

Osborn Mfg. Company, Cleveland, Ohio, is offering a novelty in the way of the Christmas tree holder here



Osborn Christmas Tree Holder.

shown. The upper view represents it in position, as when holding a tree, while the lower indicates how it can be taken apart and folded for packing in the individual box in which it comes. The legs are of hardwood, finished

in appropriate green. Two steel face plates, one on the top and one on the bottom, are riveted pivotally to the legs, so that they can be folded together, or spread out for holding the tree. Small guards on the steel face plates hold the legs in the proper position. The large spike shown in the cut is inserted through the hole in the center of the face plates and driven into the tree. The braces are of steel and detachable, as indicated. The features especially commended by the manufacturer are the neat lines and finished appearance of the holder, its compactness and strength and the simplicity of its construction making it easy and quick to make ready for use or take down and pack.

The Prisco Sanitary Sink Strainer.

The Pritchard-Strong Company, Rochester, N. Y., is offering the sanitary sink strainer illustrated in Fig. 1. The body is especially durable, consisting only of one

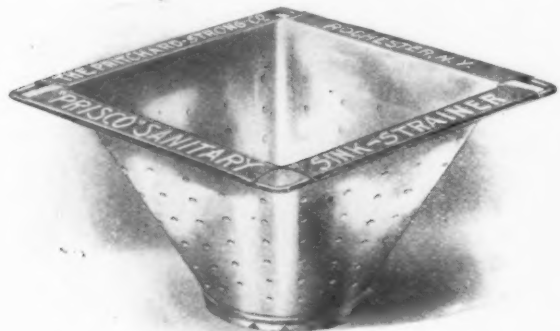


Fig. 1.—The Prisco Sanitary Sink Strainer.

piece of extra heavy bright charcoal tin. The inside of the body at the top is 6½ in. square, and the top flange is unusually wide and reinforced around the outer edge with large wire to insure strength. The perforated bot-



Fig. 2.—Will Retain Its Shape Despite Garbage Can Pounding.

tom is 3½ in. in diameter, and is double seamed to the body, so as not to come apart. In Fig. 2, the strength of the strainer is suggested, while Fig. 3 represents the strainer used as a sanitary cover for the sink drain, pre-

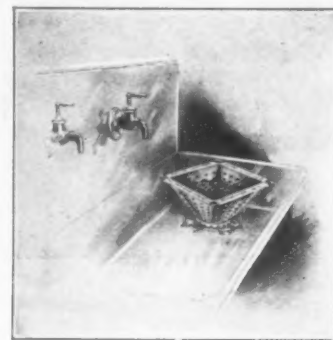


Fig. 3.—Strainer Cover for Sink Drain.

venting the accumulation of garbage in the waste pipe. The strainer will stand on its own base in any part of the sink, or it may be hung by any corner, anywhere in the sink.

Harrison Key Filing Jig.

Harrison & Co., 81 New street, New York, are marketing the Harrison key filing jig, two views of which are shown herewith. This compact tool is used for easily and accurately reproducing pin tumbler cylinder lock keys of the character illustrated. In dimensions the jig is $2\frac{3}{4} \times 1\frac{1}{2}$ in., the body of which is $\frac{3}{8}$ in. thick, weigh-

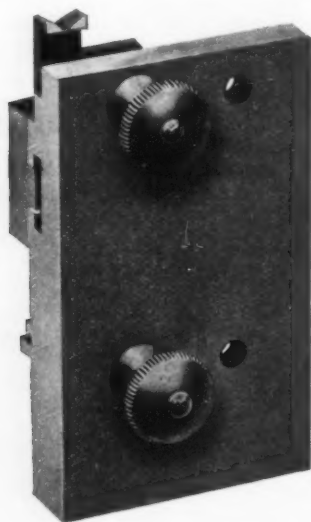


Fig. 1.—Harrison Key Filing Jig.

ing complete with two gauge pins $6\frac{1}{2}$ ounces. Fig. 1 is exact size, except that as now made it is $\frac{3}{8}$ in. longer and mortised in $\frac{1}{8}$ in., so that it can be rigidly held in a vise. The device is useful for a locksmith on repair work or for janitor, custodian of a building or a private individual, with which to renew keys without expensive power milling machinery. The two gauge pins, only one of which is used at a time, and only one illustrated, are for filing either angular or curved notches in the key blanks, according to the pattern key below. The gauge pins are of case hardened steel, thus making possible an exact duplication without altering the original key. The jig can be used for making keys that are long, short, narrow, wide, thick or thin; keys for locks with 1 to 10

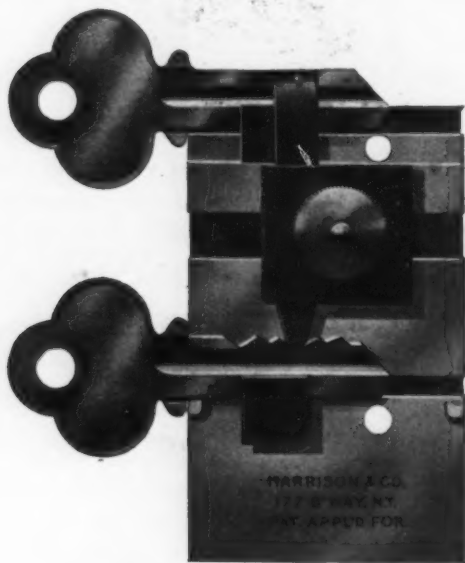


Fig. 2.—Method of Holding Pattern and Blank.

pins, inclusive, corrugated, slotted or bent. Keys can be filed to pattern for Yale, Corbin, Reading, Sargent, Russell & Erwin, Lockwood, Penn, Norwalk, Chicago and similar locks, and is especially serviceable in reproducing the bent Norwalk blank. Fig. 1 shows the jig exact size, except for the lower portion held in the vise jaws

previously referred to. Fig. 2 illustrates the pattern key below and the blank above inserted from the left side of the jig. It will be observed that there are four holes through the body of the tool, permitting the inserting of blanks from either the right or left side by shifting the screws and brass milled thumb nuts to accommodate the various kinds of blanks. Detailed instructions with illustrations showing keys inserted from both sides accompany each jig, which is neatly put up in a slide cover wood box.

Automatic Swivel Vise.

The line of automatic swivel type vises made by the Rock Island Tool Company, Rock Island, Ill., one of which is shown in the accompanying illustrations, embody features that are represented as distinctive improvements in vise construction. As will be seen by reference to the cutaway section shown in Fig. 2, the vise swivels on a hollow pivot stem rising from a separable

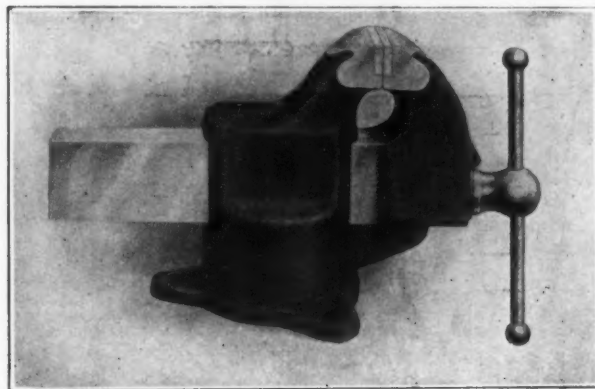


Fig. 1.—Automatic Swivel Vise.

base. Fitted in the hollow center of the pivot is a solid cylindrical pin through an extension of which the vise screw passes. By the tightening of the screw the pin is drawn tightly against the forward wall of its socket, thereby automatically locking both the vise jaws and the rotative of the swivel. The construction is exceedingly simple in design, the whole being composed of but six distinct parts. It is assembled without the use of screws

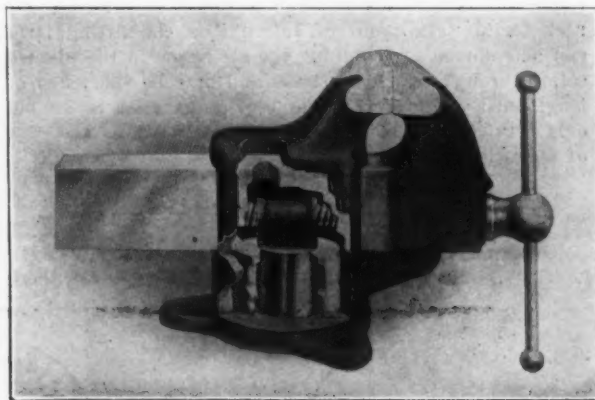
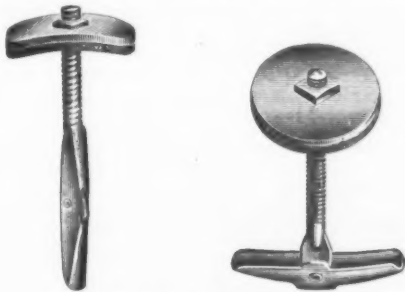


Fig. 2.—Sectional View of Vise.

or pins, and no levers are required in its operation. Besides the style herewith illustrated several other forms of this vise are made by the company, which include stationary bench and swivel pipe vises; also a stationary and swivel vise with adjustable jaws. In the latter types the rear jaw is separable from the vise body on which it is mounted and swings laterally on a pivot in either direction. It is held in position by an arc flange that fits into a corresponding groove in the vise body on which it rests. Angular shapes are thus firmly gripped on each side by both jaws. These vises are also made with base swivel sockets in both side and bottom of the body, and may be used interchangeably in either horizontal or vertical position.

Boiler Repair Toggle Bolt.

Steward & Romaine Mfg. Company, 124 North Sixth street, Philadelphia, Pa., is placing on the market the boiler repair toggle bolt shown herewith. It is designed



Boiler Repair Toggle Bolt.

for the use of plumbers and steam heating contractors in making a temporary repair to a leaky boiler, when it is not convenient to replace with a new one at once. The bolt consists of a steel toggle bolt with a rubber and a

galvanized iron washer on it. In use the toggle head of the bolt is pushed through the leak hole, which is enlarged to receive the bolt, and then drawn up tightly on the inside. The bolt then has rubber washer placed next to the outside rim of the boiler and the galvanized washer next to the nut. The nut is then screwed up, pressing the iron and rubber washers onto the outside of the boiler, making an excellent temporary repair. It is explained that in some cases plumbers have allowed the temporary bolt to remain for a long period until another leak took place.

Diamond Tack & Nail Works, Raynham, Mass., manufacturer of a comprehensive line of tacks, nails, brads, &c., is making something of a specialty of its Anti-Rust tacks, for which there is a large and steadily increasing sale. It is asserted that these tacks never rust in the carpet. They are finely finished, with saber points, and the heads will stay on when driven into hard wood. While they will hold the carpet firmly to the floor, they are easily withdrawn from floors and carpets when desired. They are packed in small red boxes, retailing at 5 cents per box. There are 144 boxes of assorted sizes, 6, 8, 10 and 12 oz., in a case.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—		Miscellaneous—		Blue, Ultramarine.....		Black, Ivory.....	
table Oils—							
Linseed, City, raw.....	44 @45	Barytes:		Brown, Vandyke.....	11 @16	Lamp, Com.....	4 @6
City, Boiled.....	45 @46	White, Foreign.....	ton \$18.50@20.50	Green, Chrome.....	12 @16	Blue, Celestial.....	4 @6
State and Western, raw.....	42 @43	Amer. floated.....	ton 19.00@20.00	Green, Paris.....	12 @15	Blue, Chinese.....	30 @33
Raw Calcutta, in bbls.....	70 @..	Off color.....	ton 13.00@16.50	Sienna, Raw.....	12 @15	Blue, Prussian.....	28 @32
Lard, Extra Prime, Winter.....	76 @77	Chalk, in bulk.....	ton 3.00@ 3.25	Sienna, Burnt.....	12 @15	Blue, Ultramarine.....	1 1/2 @15
Extra No. 1.....	56 @57	In bbls.....	100 lb ..@ .35	Umber, Raw.....	11 @14	Brown, Spanish.....	1/2 @1
No. 1.....	49 @52	China Clay, Imported.....	ton 11.00@17.50	Umber, Burnt.....	11 @14	Carmine, No. 40.....	\$3.10@3.25
Cotton-seed Crude, f.o.b. mills.....	41 @45	Cobalt, Oxide.....	100 lb 2.50@ 2.60	White Lead, Zinc, &c.—			
Summer Yellow, Prime.....	56 @56 1/2	Whiting, Commercial.....	100 lb .43@ .52				
Summer White.....	58 @58	Gilders.....	100 lb .55@ .65	Lead, English white, in Oil.....	9 @10	Green, Chrome, ordinary.....	3 1/2 @7
Yellow Winter.....	58 @58	Ex. Gilders.....	100 lb .60@ .65	Lead, American White:		Green, Chrome, pure.....	17 @25
Sperm, Crude.....	60 @60	Putty, Commercial—		Lots of 500 lb or over, in Oil.....	7 1/2 @7 1/2	Lead, Red, bbls, 1/2 bbls, kegs.....	4 @7 1/2
Natural Winter.....	72 @73	In bladders.....	\$1.70 @1.85	Lots less than 500 lb, in Oil.....	8 @8	Litharge, bbls, 1/2 bbls, kegs.....	@7 1/2
Bleached Winter.....	75 @76	In bbls, or tubs.....	1.20 @1.45	Lead, White, in oil, 25 lb tin		Ocher, American.....	ton \$8.50@16.00
Bleached Winter, Extra.....	@..	In 1 lb to 5 lb cans.....	2.65 @2.35	pails, add to keg price.....	@ 1/2	American Golden.....	2 1/2 @3 1/4
Tallow, Prime.....	60 @61	In 1 1/2 to 5 lb cans.....	1.50 @1.50	Lead, White, in oil, 12 1/2 lb tin		French.....	1 1/2 @2
Whale, Crude.....	35 @36	In machine bbls.....	.64 @.64 1/2	pails, add to keg price.....	@ 1	Foreign Golden.....	3 @4
Natural Winter.....	46 @47	Spirits Turpentine—		Lead, White, in oil, 1 to 5 lb		Orange Mineral, English.....	10 @12
Bleached Winter.....	48 @49	In Oil bbls.....	.63 @.64	ass'ted tins, add to keg price.....	@ 1 1/2	French.....	11 @12
Extra Bleached Winter.....	50 @51	In machine bbls.....	.64 @.64 1/2	Lead, American, Terms: For lots 12		German.....	12 @12
Menhaden, Brown, Strained.....	32 @33	Glue—		tons and over 1/4¢ rebate; and 2% for		American.....	8 1/2 @9
Light Strained.....	32 @33	Cabinet.....	12 @15	cash if paid in 15 days from date of		Red, Indian, English.....	4 1/2 @6
Northern.....	26 @27	Common Bone.....	7 1/2 @9	invoice; for lots of 500 lbs. and over		American.....	3 @3 1/4
Southern.....	26 @27	Extra White.....	18 @24	2% for cash if paid in 15 days from		Red, Turkey, English.....	4 @10
Cocoonut, Ceylon.....	10 lb 9 1/2 @9 1/2	Foot Stock, White.....	12 @14	date of invoice, for lots of less than		Red, Tuscan, English.....	7 @10
Cochin.....	10 lb 10 1/2 @10 1/2	Foot Stock, Brown.....	9 @11	500 lbs. net.....		Red, Venetian, Amer.....	100 lb \$0.50@1.25
Cod, Domestic, Prime.....	36 @38	German Hide.....	12 @18	Zinc, American, dry.....	5 1/2 @5 1/2	English.....	100 lb \$1.15@1.60
Newfoundland.....	40 @42	French.....	10 @40	Zinc, French.....		Sienna, Italian, Burnt and	
Red, Elaine.....	47 @50	Irish.....	13 @16	Antwerp, Red Seal, dry.....	8 1/2	Powdered.....	3 @6
Saponified.....	10 lb 6 1/2 @7	Low Grade.....	10 @12	Antwerp, Green Seal, dry.....	10 1/2	Italian, Raw, Powdered.....	3 @7
Olive, Italian, bbls., Yellow.....	87 1/2 @1.00	Medium White.....	14 @17	Paris, Red Seal, dry.....	9 1/2	American, Raw.....	1 1/2 @2
Neatsfoot, Prime.....	56 @57	Gum Shellac—		Paris, Green Seal, dry.....	11	American Burnt and Pow'd.....	1 1/2 @2
Palm, Logos.....	10 lb 7 @7 1/4	Bleached, Commercial.....	45 @46	Zinc, V. M. French, in Poppy Oil:		Talc, French.....	100 lb \$18.00@25.00
Mineral Oils—		Bone, Dry.....	56 @57	Green Seal:		American.....	100 lb 15.00@25.00
Black, 29 gravity, 25@30 cold test.....	11 1/2 @12	Button.....	40 @50	Lots of 1 ton and over.....	13 1/4 @13 1/2	Terra Alba, French.....	100 lb .80@1.00
29 gravity, 15 cold test.....	12 1/2 @13 1/2	Diamond I.....	59 @60	Lots of less than 1 ton.....	13 1/2 @13 1/2	English.....	100 lb .80@1.00
Summer.....	11 1/2 @12	Fine Orange.....	52 @57	Zinc, V. M. French, in Poppy Oil:		American.....	100 lb No. 1 .75@ .80
Cylinder, light filtered.....	19 @20	A. C. Garnet.....	46 @47	Red Seal:		American.....	100 lb No. 2 .60@ .65
Dark, filtered.....	16 1/2 @17 1/2	Kala Button.....	35 @36	Lots of 1 ton and over.....	11 1/2 @12 1/2	Umber, T'key, Bnt & Pow'd.....	2 @3 1/2
Paraffine, 903-907 gravity.....	14 @14 1/2	D. C.....	62 @63	Lots of less than 1 ton.....	12 1/2 @12 1/2	Turkey, Raw and Powdered.....	2 @3 1/2
600 gravity.....	13 @13 1/2	Octagon B.....	56 @57	Discounts.—French Zinc.—Discounts		Burnt, American.....	1 1/2 @2
883 gravity.....	10 1/2 @11 1/2	T. N.....	45 @48	to buyers of 10 bbl, lots of one or mixed		Raw, American.....	1 1/2 @2
Red.....	13 @14 1/2	V. S. O.....	59 @60	grades, 12; 25 bbls, 2%; 50 bbls, 4%.		Yellow Chrome, Pure.....	12 @14
		Colors in Oil—		Dry Colors—			
		Black, Lampblack.....	12 @14	Black, Carbon.....	6 1/2 @10	Vermillion, American Lead.....	7 @25
		Blue, Chinese.....	36 @46	Black Drop, American.....	3 1/2 @8	Quicksilver, bulk.....	65 @..
		Blue, Prussian.....	32 @36	Black Drop, English.....	5 @15	Quicksilver, bags.....	@61
				English, Imported.....			
				Chinese.....			
				\$0.90@1.10			

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33% @ 33% & 10% signifies

that the price of the goods in question ranges from 33% per cent. discount to 33% and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1906, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00.....33%
North's.....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—See Caps, Cartridges, Shells, &c.

Anti-Rattlers—

Fernald Mfg. Co. Burton Anti-Rattlers, $\frac{1}{2}$ doz. pairs, Nos. 1, \$0.75; 2, \$0.60; 4, \$1.00; 5, \$0.50.
Fernald Quick Shifter, $\frac{1}{2}$ doz. pairs.....\$2.00@3.00

Anvils—American—

Eagle Anvils..... $\frac{1}{2}$ lb. @ 8%
Hay-Budden, Wrought.....9%
Trenton..... $\frac{1}{2}$ lb. @ 9%

Imported—

Peter Wright & Sons, $\frac{1}{2}$ lb. 81 to 310 lb. 11%: 350 to 600 lb. 11%
Anvil, Vise and Drill—

Milners Falls Co., \$18.00.....15%
Apple Parers—See Parers, Apple, &c.

Aprons, Blacksmiths'—

Livingston Nail Co.....33%

Augers and Bits—

Com. Double Spur.....70%
Jennings' Patn., reg. Finish.....60%

Black Lip or Blued.....65%
Boring Mach. Augers.....70%

Car Bits, 12-in. twist.....40%
Ford's Auger and Car Bits.....40%

Fl. Washington Auger Co., Concord's.....35%

Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list.....25%

No. 30, R. Jennings' list.....40%
Russell Jennings.....35%

L'Honnemieu Car Bits.....15%
Mayhew's Countersink Bits.....15%

Pugh's Black.....40%
Pugh's Jennings' Pattern.....40%

Snell's Auger Bits.....40%
Snell's Bell Hangers Bits.....40%

Snell's Car Bits, 12-in. twist.....40%
Snell's King Auger Bits.....40%

Wright's Jennings' Bits.....40%

Bit Stock Drills—

See Drills, Twist.

Expansive Bits—

Clark's small, \$15; large, \$25.....50%
Clark's Pattern, No. 1, $\frac{1}{2}$ doz. 12%
No. 2, \$18.....60%

Ford's, Clark's Pattern.....60%
C. E. Jennings & Co., Steer's Pat. 25%
Lavigne Pat. small size, \$18.00; large size, \$26.00.....40%

Swan's.....60%

Gimlet Bits—

Common Dble. Cut.....\$3.00@3.25
German Pattern, Nos. 1 to 10, \$4.75; 11 to 13, \$5.75

Hollow Augers—

Bonney Pat., per doz. \$6.50@7.00
Ames.....20%
Universal.....20%

Wood's Universal.....20%

Ship Augers and Bits—

Ship Augers.....40%
Ford's.....33%

C. E. Jennings & Co.:
L'Honnemieu's.....15%
Watrous'.....33%

Snell's.....40%

Awl Hafts—See Handles, Mechanic's Tool.

Awls—

Brad Awls:
Handled.....gro. \$2.75@3.00
Unhanded, Shlivered.....gro. \$2.50@2.75
Unhanded, Patent.....gro. \$2.00@2.25

Peg Awls:
Unhanded, Patent.....gro. \$1.50@1.75
Unhanded, Shlivered.....gro. \$1.25@1.50

Scratch Awls:
Handled, Com.....gro. \$3.50@4.00
Handled, Socket.....gro. \$11.50@12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Single Bit, base weights: Per doz.
First Quality.....\$1.75@2.00
Second Quality.....\$1.25@1.50

Double Bit, base weights:
First Quality.....\$7.00@7.50
Second Quality.....\$6.50@7.00

Axle Grease—

See Grease, Axle

Axles—

Concord, Loose Collar.....45%
Concord, Solid Collar.....45%
No. 1 Common, Loose.....35%
No. 14 Com., New Styles.....45%
No. 2 Solid Collar.....35%

Half Patent:
Nos. 7, 8, 11 and 12.....70%
Nos. 13 to 14.....70%
Nos. 15 to 18.....75%
Nos. 19 to 22.....75%

Boxes, Axle—

Common and Concord, not turned lb. $\frac{1}{2}$ @45¢
Common and Concord, turned lb. $\frac{1}{2}$ @46¢
Half Patent.....lb. $\frac{1}{2}$ @10¢

Bait—

Hendryx:
A Bait.....30%
B Bait.....30%
Competitor Bait.....20%

Balances—

Caldwell new list.....50%
Fullman.....50%

Spring—

Spring Balances.....50%
Chattillon's:
Light Spg. Balances.....50%
Straight Balances.....50%
Circular Balances.....50%
Large Dial.....50%

Barb Wire—See Wire, Barb.

Bars—

Steel Crowbars, 10 to 40 lb. per 10, 2% @ 3¢

Towel

No. 10 Ideal, Nickel Plate.....gro. \$3.50

Beams, Scale—

Scale Beams.....40%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—

Holt-Lyon Co.:
No. 12 Wire Coppered $\frac{1}{2}$ doz. \$1.20;
Tinned.....\$0.85
No. 11 Wire Coppered $\frac{1}{2}$ doz. \$1.15;
Tinned.....\$1.20
No. 10 Wire Tinned.....\$1.50
Western W. G. Co.:
No. 1 Electric.....gro. \$7.50
No. 2 Buffalo.....gro. \$8.00
No. 3 Perfection Dust.....gro. \$8.00

Egg—

Holt-Lyon Co.:
Holt, per doz. No. 5, Jap'd, \$0.80;
No. A, Jap'd, \$1.15; No. B, Jap'd, \$1.85; No. 6, Jap'd, \$1.65;
Lyon, Jap'd, per doz. No. 2, \$1.35.

Taplin Mfg. Co.:
Improved Dover, per gro. No. 60, \$4.00; No. 75, \$4.50; No. 100, \$7.00;
No. 102, Tin'd, \$4.50; No. 120, Hotel, \$15.00; No. 122, Hotel, Tin'd, \$17.00; No. 200, Tumbler, \$8.50; No. 202, Tumbler Tin'd, \$9.50; No. 300, Mammoth, per doz., \$25.00.

Termer & Seymour Mfg. Co.:
T. & S. Dover, $\frac{1}{2}$ gro. Buffalo, No. 2, \$8.00; Perfection, No. 3, \$9.00.

Wonder (R. M. Co.).....gro. net, \$4.25

Bellows—

Blacksmith, Standard List.....45%
Split Leather.....65%
Grain Leather.....60%

Hand—

Inch. 6 7 8 9 10
Doz. \$5.00 5.50 6.00 6.50 7.50

Molders—

Inch. 10 12 14 16
Doz. \$7.50 9.00 12.00 15.00

Bells—

Ordinary Goods.....75%
High grade.....70%
Texas Star.....50%

Door—

Abbe's Gong.....40%
Barton Gong.....50%
Home R. & E. Mfg. Co.'s.....50%
Trip Gong.....50%
Yankee Gong.....50%

Hand—

Polished, Brass.....50%
White Metal.....50%
Nickel Plated.....50%

Miscellaneous—

Farm Bells.....lb. $\frac{1}{2}$ @15¢
Church and School.....60%
Table Call Bells.....60%

Belting—

Extra Heavy, Short Lap.....60%
Regular Short Lap.....60%
Standard.....70%
Light Standard.....75%
Cut Leather Lacing.....40%
Leather Lacing Straps, per sq. ft. 25¢

Rubber—

Agricultural (Low Grade).....75%
Common Standard.....70%
Standard.....70%
Extra.....60%
High Grade.....50%

Bench Stops—

See Stops, Bench

Benders and Upsetters, Tire—

Detroit Perfected Tire Bender.....40%
Detroit Stoddard's Lightning Tire Upsetter, No. 1, \$1.25; No. 2, \$1.75; No. 3, \$10.00; No. 4, \$16.25; No. 5, \$23.50.

Green River Tire Benders and Upsetters.....30%

Bicycle Goods—

John S. Long's Son & Co.'s 1907 list:
Chain, Parts, Spokes.....50%
Tubes.....60%

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See Augers and Bits.

Blocks—

Common Wooden.....75%
Hartz St. Tackle Blocks.....50%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50%
Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50%; Wire Rope Snatch, 50%
Lane's Patent Automatic Lock and Junior.....30%
Stowell's Novelty, Mal. Iron.....50%
Stowell's Loading.....50%
See also Machines, Hoisting.

Beards, Stove—

Paper and Wood Lined.....40%
Embossed.....50%

Boards, Wash—

See Washboards.

Bobs, Plumb—

Keuffel & Esser Co.....30%

Belts—

Carriage, Machine, &c.—
Common Carriage (cut thread):
% X 6 and smaller.....70%
Larger and Longer.....60%
Phila. Eagle \$3.00 list May 21, '99

Bolt Ends.....65%
Machine, % x 4 and smaller.....70%
Machine, larger and longer.....60%

Door and Shutter—

Cast Iron Barrel, Japanned, Round Brass Knob:
Inch. 3 4 5 6 8
Per doz. \$0.30 35 45 60 80
Cast Iron Spring Foot, Jap'd:
Inch. 6 8 10
Per doz. \$1.20 1.50 2.25
Cast Iron Chain, Flat, Japanned:
Inch. 6 8 10
Per doz. \$1.00 1.40 1.85
Cast Iron Flat Shutter, Jap'd, Brass Knobs:
Inch. 6 8 10
Per doz. \$0.75 55 1.25
Wrought Barrel Jap'd.....80%
Barrel Bronzed.....60%
Spring.....70%
Shutter.....50%
Square Neck.....75%
Ives' Patent Door.....50%

Plow and Stove—

Plow.....65%
Stove.....80%

Tire—

Common Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '91.....80%
Eagle Phila., list Oct. 16, '91.....80%
Bay State, list Dec. 29, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '91.....80%
Eagle Phila., list Oct. 16, '91.....80%
Eclipse, list Dec. 29, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '91.....80%
Eagle Phila., list Oct. 16, '91.....80%
Mount Carmel, list Dec. 29, '99.....80%
Russell, Burdall & Ward Bolt & Nut Co.:
Empire, list Dec. 29, '99.....80%
Norway Phila., list Oct. 16, '91.....80%
Shelton Co.:
Tiger Brand, list Dec. 29, '99.....80%
Phila., Eagle, list Oct. 16, 1884.....80%
Upon Nut Co.:
Tire Bolts.....72%

Borers, Tap—

Borers Tap, Ring, with Handle:
Inch. 1 1 1/2 1 3/4 2
Per doz. \$4.80 5.60 6.40 8.00
Inch. 2 2 1/2 3 3 1/2 4 4 1/2
Per doz. \$5.65 6.45 7.25 8.05
Enterprise Mfg. Co. No. 1, \$1.25; No. 2, \$1.75; No. 3, \$2.50 each.....25%

Boxes, Mitre—

C. E. Jennings & Co.....30%
Langdon, New Langdon and Langdon Improved, 20%
Acme.....15%
Perfection.....15%
Sealey.....40%
Stanley R. & L. Co.:
400, 30%; No. 50 and 60.....35%

Braces—

Common Ball, American, \$1.25@1.50
Barber's.....50%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414.....60%
C. E. Jennings & Co.....60%
Mayhew's Hatchet.....50%
Mayhew's Quick Action Hay Pat.....50%
Millers Falls Drill Braces.....55%
P. S. & W. Co., Peck's Pat. 60%
Stanley R. & L. Co.:
Stanley, 35%; Victor.....45%

Brackets—

Wrought Steel.....70%
Griffin's Pressed Steel.....75%
Griffin's Folding Brackets.....70%
Stowell's Cast Shelf, 75%; Sink.....50%
Western W. G. Co., Wire.....60%

Bright Wire Goods—

See Wire and Wire Goods.

Broilers—

Kilbourne Mfg. Co.....75%
Western W. G. Co.....80%
Wire Goods Co.....75%

Buckets, Galvanized—

M'P's list, price per gross:
Quart. 10 12 14
Water, Reg. 25.35 28.00 32.00
Water, H.C.P. 45.55 48.00 52.00
Fire, Rd. Btm. 32.00 34.65 38.65
Well.....37.35 41.35 45.35

Bucks, Saw—

Hoosier.....gro. \$36.00

Bull Rings—See Rings, Bull

Butts—

Wrought, High List, Oct. 26, '06, 45¢@45¢

Cast Iron—

Fast Joint, Broad.....40%
Fast Joint, Narrow.....40%
Loose Joint.....70%
Loose Pin.....70%
Mayer's Hinges.....70%
Parliament Butts.....70%

Wrought Steel—

Reversible and Broad.....70%
Light Reversible, Light Narrow.....70%
Loose Joint, Narrow, Light Inside Blind, etc.....70%
Back Flaps, Table Chest.....65%

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, 1200, 2500, 3000, 4000, 500

Hendryx Bronze; Series 706, 900.40%
Hendryx Enameled.....40%

Calipers—See Compasses.

Calks, Toe and Heel—

Blunt, 1 prong, per lb., 4 1/4 @ 4 3/4¢
Sharp, 1 prong, per lb., 4 1/4 @ 4 3/4¢
Burke's Blunt, 4 1/4 @ 4 3/4¢; Sharp, 4 1/4 @ 4 3/4¢
Gautier, Blunt, 4 1/4¢; Sharp, 4 1/4¢
Perkins, Blunt, 3 lb. 3.65¢; Sharp, 4.15¢

Can Openers—

See Openers, Can.

Cans, Milk—

Illinois Pattern.....1.35 1.85 2.35 each.
New York Pattern.....1.50 2.00 2.45 each.
Baltimore Pattern.....1.50 2.25 2.45 each.
Dubuque.....1.35 1.60 1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:
3 10 gal. \$18.00 60.00 120.00 gro. net.

Caps, Percussion—

Eley's E. B.....50¢ @ 55¢
G. D.....per M 34¢ @ 35¢
F. L.....per M 40¢ @ 42¢
G. E.....per M 40¢ @ 50¢
Musket.....per M 60¢ @ 65¢

Primers—

Berdan Primers, \$2 per M.....20¢ @ 25¢
Primer Shells and Bullets.....15¢ @ 10¢
All other primers per M \$1.52 @ 1.60

Cartridges—

Blank Cartridges:
32 C. F., \$3.50.....10¢ @ 5¢
38 C. F., \$7.00.....10¢ @ 5¢
32 cal. Rim, \$1.50.....10¢ @ 5¢
32 cal. Rim, \$2.75.....10¢ @ 5¢
B. B. Caps, Con. Ball, Supd. \$1.50
B. B. Caps, Round Ball.....\$1.49
Central Fire.....25¢
Target and Sporting Rifle.....15¢ @ 5¢
Primed Shells and Bullets.....15¢ @ 10¢
Rim Fire, Sporting.....50¢
Rim Fire, Military.....15¢ @ 5¢

Casters—

Bed.....65¢ @ 10¢
Plate.....60¢ @ 5¢
Philadelphia.....70¢ @ 10¢
Acme, Ball Bearing.....35¢ @ 10¢
Boss Anti-Friction.....10¢ @ 10¢
Gem (Roller Bearing).....50¢
Martin's Patent (Phoenix).....45¢
Standard Ball Bearing.....45¢
Tucker's Patent low list.....30¢
Yale (Double Wheel) low list.....50¢

Cattle Leaders—

See Leaders, Cattle.

Chain, Proof Coil—

American Coil, Straight Link:
5-16 1/4 5-16 3/4 7-16 1/2 7-16 3/4 9-16 1/2
\$9.77 6.17 5.92 4.57 4.37 4.27 4.22
1/4 3/8 1/2 5/8 3/4 1 1 1/4 1 1/2 1 3/4 2
\$4.77 4.07 4.02 4.12
In cash lots, deduct 25¢
German Coil.....60¢ @ 10¢ @ 70%

Halter—

Halter Chains.....60¢ @ 60¢ @ 5¢
German Pattern Halter Chains,
list July 24, '97.....60¢ @ 60¢ @ 5¢
Covert Mfg. Co.....35¢ @ 5¢

Cow Ties—

See Halters and Ties.

Trace, Wagon, &c.—

Traces, Western Standard: 100 gr.
6 1/2-6-3, Straight, with ring.....\$28.00
6 1/2-6-2, Straight, with ring.....\$29.00
6 1/2-6-2, Straight, with ring.....\$28.00
6 1/2-6-2, Straight, with ring.....\$27.00

NOTE—Add 2¢ per pair for Hooks.
Twist Traces; add per pair for Nos. 2
and 3, 2¢; No. 1, 3¢; No. 4, 4¢ to price of
Straight Link.

Eastern Standard Traces, Wag-

on Chain, &c.....60%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60¢ @ 10¢
Brass.....50¢ @ 10¢
Safety and Plumbers' Chain.....60¢ @ 10¢

Gal. Pump Chain—

Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stal-
lion.....40%

Onaida Community:

American Halter, Dog and Kennel
Chains.....35¢ @ 40¢
Niagara Dog Leads and Kennel
Chains.....60¢ @ 5¢
Wire Goods Co.:
Dog Chain.....70¢ @ 10¢
Universal Dbl.-Jointed Chain.....50¢

Chain and Ribbon, Sash—

Onaida Community:
Steel Chain.....60%
Pullman:
Bronze Chain, 60%; Steel Chain,
60% @ 10%
Sash Chain Attachments, per set, 3¢
Aluminum Sash Ribbon, per 100
ft.....\$1.25 @ 3.00
Sash Ribbon Attachments, per set, 3¢

Chalk—(From Jobbers.)

Carpenters' Blue.....50¢ @ 55¢
Carpenters' Red.....45¢ @ 50¢
Carpenters' White.....40¢ @ 45¢

Checks, Door—

Bardley's.....45%
Pullman, per gro.....\$5.00
Russwin.....33 1/2%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....55%
Youths' Chests, with Tools.....40%

Gentlemen's Chests, with Tools.....30%
Farmers', Carpenters', etc., Chests,
with Tools.....25%
Machinists' and Pipe Fitters'
Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machine
Tool Chests.....33 1/2 @ 10%

Chisels—

Socket Framing and Firmer

Standard List.....70¢ @ 10¢ @ 75%

C. E. Jennings & Co.:
Socket Firmer No. 10.....60%
Socket Framing No. 15.....60%
Swan's.....66 2/3 @ 70%
L. & I. J. White Co.....30¢ @ 30¢ @ 3%

Tanged—

Tanged Firmers.....30¢ @ 35%

Buck Bros.....30%
C. E. Jennings & Co. Nos. 191, 191, 25%
L. & I. J. White Co.....25%

Cold—

Cold Chisels, good quality.....15¢ @ 15¢
Cold Chisels, fair quality.....11¢ @ 11¢
Cold Chisels, ordinary.....9¢ @ 10¢

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat., each \$8.00.....35¢ @ 5¢
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....40%
Universal, Reversible Jaws.....40%
Combination, Reversible Jaws.....40%
Drill Chucks, New Model.....25%
Standard, 40¢ @ 10¢; Skinner Pat.,
25%; Positive Drive.....45%
Planer Chucks.....25%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6,
7, 8 and 17, 40%; No. 21.....35%
Scroll Combination, Nos. 82 and
94.....30%
Geared Scroll, Nos. 33, 34 and 35.....30%
Independent Iron, Nos. 18 and 38.....30%
Independent Steel, No. 64.....25%
Union Drill, Nos. 000, 00, 100, 101,
102, 103, 104.....35%
Union Czar Drill.....25%
Universal, No. 42.....30%
Iron Face Plate Jaws, Nos. 28, 30,
48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and
72.....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Grip.....50%
Little Giant Double Grip Drill.....50%
Little Giant Drill, Improved.....50%
Onaida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable Hammers.....20¢ @ 45¢
Carriage Makers, P. B. & W.
Co.....40¢ @ 10¢ @ 50%
Besly, Parallel.....33 1/2 @ 10%
Myers' Hay Rack.....45%
Lyneman's, Utica Drop Forge & Tool
Co.....40%
Workers, Hammers.....40%
Saw Clamps, see Vises, Saw Filers.

Cleaners, Drain—

Iwan's Champion, Adjustable.....35%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel.....\$4.05 net
Star Shank, All Steel.....\$3.24 net
W. & C. Shank, All Steel.....\$3.00 net
1 1/2 in., \$3.00; 1 in., \$3.25.

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and

Sheep—

Chicago Flexible Shaft Company:
1902 Chicago Horse, each.....\$10.75
20th Century Horse, each.....\$5.00
Lightning Belt Horse, each.....\$15.00
Chicago Belt Horse, each.....\$20.00
Stewart's Enclosed Gear
Horse, each.....\$11.75
Stewart's Patent Sheep Shear-
ing Machine, each.....\$12.75
Stewart Enclosed Gear Shear-
ing Machine, No. 8, each.....\$9.75

Clips, Axle—

Regular Styles, list July 1, '05.80%

Cloth and Netting, Wire

—See Wire, &c.

Cocks, Brass—

Hardware Hat:
Plain Bibbs, Globe, Kerosene,
Racking, Liquor, Bottling,
&c.....60¢ @ 10¢ @ 65%
Compression Bibbs.....55¢ @ 10¢ @ 60%

Coffee Mills—

See Mills, Coffee.

Collars, Dog—

Nickel Chain, Walter B. Stevens &
Sons' list.....40%
Leather, Walter B. Stevens & Son's
list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Compasses, Dividers, &c.

Ordinary Goods.....70¢ @ 10¢ @ 75%
Wm. Schollhorn Co.:
Excelsior Dividers.....35%
Lodi Dividers.....75%

Conductor Pipe—

L. C. L. to Dealers:
Galv. Charcoal Copper.
Steel. Iron. 14, 16 & 20 oz.
Eastern:
70% 80¢ @ 7 1/2% 30%

Central: 65¢ @ 10% 55¢ @ 2 1/2% 80¢ @ 10%
Western and Southern:
65¢ @ 10% 50¢ @ 7 1/2% 80¢ @ 7 1/2%
So. Western:
50¢ @ 2 1/2% 50% 20¢ @ 5%
Terms, 60 days; 2% cash 10 days. Fac-
tory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each.....2 3 4 6 8
Labrador.....\$1.20 \$1.50 \$1.80 \$2.10 \$2.70
Gal.....3 4 6 8 10
Iceland, ea.....\$1.80 \$2.10 \$2.40 \$3.00
Gal.....2 3 4 6 8
Galvanized, ea.....\$1.85 \$2.00 \$2.25 \$2.50 \$3.00
Galvanized, 12 in., side handles.
Gal.....2 3 4 6 8
Each.....\$1.95 \$2.15 \$2.40 \$3.30 \$1.15
White Enameled, 25%; Agate Lined, 25%

Coopers' Tools—

See Tools, Coopers'.

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair
and heavier, 32¢ @ 35¢; lighter
than 3 lb. to pair.....34¢ @ 37¢

Cord—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8
to 12, 26¢; No. 7, 26 1/2¢; No. 6,
27 1/2¢
Cable Laid Italian, lb., No. 18.....57¢
Italian, lb., A. No. 18, 23¢; B, 22¢
Common India.....lb., 11¢ @ 11 1/2¢
Cotton Sash Cord, Twisted.....lb. 20¢
Patent Russia.....lb.....20¢
Cable Laid Russia.....lb.....21¢
India Hemp, Br'd'd.....lb.....21¢
India Hemp, Twisted.....lb. 13¢ @ 14¢
Patent India, Twisted.....lb.....17¢
Ammonium Cordage Co.:
Braided, Nos. 8 to 12, \$0.24; No. 7,
\$0.21 1/2; No. 6, \$0.25 1/2; 30 doz., 50 ft.,
Oriole, \$2.00; 50 ft., Columbia, \$0.85;
50 ft., Victors, \$1.00; 50 ft., 6-Thread,
\$1.10; 60 ft., 3-Thread, \$0.95; 50 ft.,
Manila, \$1.40; 60 ft., Jute, \$0.75.
Pearl Braided, cotton, No. 6, 40¢ lb.
27 1/2¢; No. 7, 25¢; Nos. 8 to 12, 26¢
Eddystone, Braided, Nos. 8 to 12,
26¢; 7, 26 1/2¢; 6, 27 1/2¢
Harmony Cable Laid Italian, Nos. 7
to 10.....\$0.23 @ 2¢
Fullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz. 10¢
Samson, Nos. 8 to 12:
Braided, 3 lb., Drab Cotton,
50¢; Italian Hemp, 40¢; Linen,
50¢; Linen, 65¢; White Cot-
ton, 50¢; Spot Cord.....50¢
Massachusetts, White.....\$0.40 lb.
Massachusetts, Drab.....\$0.45 lb.
Phoenix, White, Nos. 8 to 12, 27¢
Silver Lake, per lb.:
A, Drab, 45¢; B, White, 40¢;
B, Drab, 40¢; B, White, 35¢;
Italian Hemp, 40¢; Linen,
50¢ @ 55¢ @ 57 1/2¢
See also Chain and Ribbon.

Wire, Picture—

List July 10, 1906.85¢ @ 10¢ @ 85¢ @ 10¢ @ 10%
Hendryx Standard Wire Picture Cord,
old list.....85¢ @ 10%
Turner & Stanton Co. Wire Picture
Cord.....90%

Cradles—

Grain.....40¢ @ 10 1/2%

Crayons—

White Round Crayons, Cases, 100
gro., \$5.50 @ 5.75 at factory, but
lower prices made by jobbers

Zelnicke's Lumber.....\$0.75 gro.
White and Purple, Indefinite.....\$7.50
Blue, Red, Green, Yellow and
Terra Cotta, \$6.50; Black.....\$4.00
Giant Lumber, 5 1/2 in. x 15-16 in.
round, all colors, \$16.25; Indefi-
nite.....\$18.75
Genuine Soapstone, Metal Workers'
5 in. x 3 1/2 in. Round, \$2.50; 5 in. x
3 1/2 in. Square, \$1.75; 5 x 3 1/2 x 3-16,
\$2.50; 5 x 1 1/2 x 3-16.....\$3.00

Crooks, Shepherds'—

Fort Madison, per doz., Heavy, \$7.00;
Light.....\$4.50

Crow Bars—See Bars, Crow.

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1817, per doz. \$3.50
Star, Eagle, Rogers & Hamilton
and Anchor.....per doz. \$3.00
Wm. Rogers & Son.....per doz. \$2.50

Cutters—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%
Nos. 401 402 403 404 405 406 407
Each.....\$5 \$7 \$10 \$12 \$25 \$30 \$50
Enterprise:
Nos. 5 10 12 22 32
Each.....\$2 \$3 \$2.75 \$1.50 \$6 25¢ @ 25¢ @ 7 1/2%
No. 22, \$1.50.....40¢ @ 7 1/2%
Dixon's.....per doz. 30¢ @ 30¢ @ 5%
Nos. \$14.00 \$17.00 \$19.00 \$30.00
Ideal.....40¢ @ 40¢ @ 5%
Little Giant.....per doz. 40¢ @ 50%
Nos. 305 310 312 320 322
\$35.00 \$48.00 \$44.00 \$72.00 \$68.00
N. E. Food Choppers.....25%
New Triumph No. 605, per doz. \$24.00
10¢ @ 50%
Russwin Food, No. 1, \$24.00; No. 2,
\$27.00.....45¢ @ 10¢ @ 10%
Woodruff's.....per doz. 30¢ @ 30¢ @ 5%
Nos. 100.....150
Enterprise Beef Shavers.....25¢ @ 30%

Slaw and Kraut—

Henry Diston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife.....per doz. \$3.00
Combined Slaw Cutter and Corn
Grater.....per doz. \$4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife.....per gr. \$18¢ @ 20¢
Slaw Cutters, 2 Knife.....per gr. \$22¢ @ 25¢

Tobacco—

All Iron, Cheap.....doz. \$1.25 @ \$1.50
Enterprise.....per doz. 25¢ @ 30%
National, per doz., No. 1, \$21; No. 2,
\$18.....40%

Diggers, Post Hole, &c.—

Diston's:
Rapid, per doz., \$24.00.....25%
Samson, per doz., \$34.00.....25%
Iwan's Improved Post Hole Auger.....40%
Vaughan Pattern Post Hole Augers,
per doz., \$6.25
Perfection Post Hole Diggers,
per doz., \$8.75
Split Handle Post Hole Diggers,
per doz., \$7.75
Kohler's, per doz., Universal, \$14.00;
Little Giant, \$12.00; Hercules,
\$10.00; Invincible, \$8.00; Rival,
\$8.00; Pioneer.....\$7.00
Never-Break Post Hole Diggers,
per doz., \$24.00.....60%

Dividers—See Compasses.

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, per
doz., \$18; No. 2, \$15; No. 3, \$12;
No. 4, \$18.

Drawing Knives—

See Knives, Drawing.

Dressers, Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmiths' Common Drilling
Machines.....\$1.50 @ \$1.75
Breast, Millers Falls.....10¢ @ 10¢
Breast, P. S. & W.....40%
Goodell Automatic Drills.....50¢ @ 10¢ @ 60¢ @ 10%
Johnson's Automatic Drills, Nos. 2
and 3.....16 1/2%
Johnson's Drill Points.....16 1/2%
Millers Falls Automatic Drills.....33 1/2 @ 10¢
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Im-
proved.....40%
Ratchet, No. 012.....40%
Ratchet, Celebrated.....40%
Ratchet, Whitney's, P. S. & W.....50%
Whitney's Hand Drill, No. 1, \$10.00;
Adjustable, No. 10, \$12.00.....33 1/2%

Twist Drills—

Bit Stock.....60¢ @ 10¢ @ 10%
Taper and Straight Shank.....60¢ @ 10¢ @ 10¢ @ 5%

Drivers, Screw—

Screw Driver Bits, per doz. 45¢ @ 50¢
Balsey's Screw Holder and Driver, per
doz., 2 1/2 in., \$6; 4 in., \$7.50; 6 in.,
\$9

Buck Bros.' Screw Driver Bits.....30%
Champion.....30%
Diston's.....70%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, \$12.50;
Ford's Brace Screw Drivers.....40¢ @ 10%
Gay's Double Action Hatchet.....35%
Goodell's Auto.....60%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, Nos. 20 and 21.....25¢ @ 10%
Millers Falls, Nos. 11, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 1

Extractors, Lemon Juice

—See Squeezers, Lemon.

Fasteners, Blind—

Zimmerman's 50&10%
Walling's 60&10%

Cord and Weight—

Ires 33&4%

Faucets—

Cork Lined 50&50&10%
Metallic Key, Leather Lined 60&10&70%

Red Cedar 40&10&50%
Petroleum 70&10&75%

B. & L. B. Co. 60&10%
Metal Key 60%
Star 50&10%
West Lock 50&10%

John Sommer's Peerless Tin Key 50%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Mtl. Key 50&10%
John Sommer's Duplex Metal Key 40%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined 50%
John Sommer's Reliable Cork Lined 50&10%

John Sommer's Chicago Cork Lined 60%
John Sommer's U. K. Cork Lined 50%
John Sommer's No Brand Cedar 50%
John Sommer's Perfection Cedar 40%
McKenna, Brass 25%
Burglar Proof, N. P. 25%
Improved, 1/2 and 1/4 inch 25%

Self Measuring, 1/2 doz. \$36.00 40&10%
Enterprise, 1/2 doz. \$36.00 40&10%
Lane's, 1/2 doz. \$36.00 40&10%
National Measuring, 1/2 doz. \$36.00 40&10%

Felloe Plates—

See Plates, Felloe.

Files— Domestic—

List Nov. 1, 1899.

Best Brands 70&10&75&10%
Standard Brands 75&10&75&10%
Lower Grade 75&10&10&80&10%

Imported—
Stubs' Tapers, Stubs' list, July 21, '97 33 1/3 & 40%

Fixtures, Fire Door—

Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 \$3.75
Fusible Links, No. 96 50%
Expansion Bolt, No. 107 60&10%

Grindstone—

Net Prices:
1/2 inch 15 17 19 21
Per doz. \$3.25 3.75 4.25 4.75
P. S. & W. Co. 40&10%
Reading Hardware Co. 60%
Stowell's Giant Grindstone Hanger 40%
Stowell's Grindstone Fixtures, Extra Heavy, 40&10%; Light 50%

Fodder Squeezers—

See Compressors.

Forks—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Iowa Dig-Easy Potatoes 60&10%
Victor, Hay 60&15&25%
Victor, Manure 60%
Victor, Header 60%
Champion, Hay 60%
Champion, Manure 60&15&25%
Champion, Header 60%
Columbia, Hay 60&20%
Columbia, Manure 70%
Columbia, Spading 70&12%
Hawkeye Wood Barley 40%
W. & C. Potato Digger 60&20%
Acme Hay 60&20%
Acme Manure, 4 tine 60&10&45%
Dakota Header 60&20%
Jackson Steel Barley 60&20%
Kansas Header 60%
W. & C. Favorite Wood Barley 40%
Plated.—See Spoons.

Frames— Wood Saw—

White, 8'x7' Bar, per doz. 75&80¢
Red, 8'x7' Bar, per doz. \$1.00&1.25
Red, Dbl. Brace, per doz. \$1.40&1.50

Freezers, Ice Cream—

Qt. 1 2 3 4 6
Each \$1.50 \$1.60 \$1.90 \$2.20 \$2.50

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry, Pans—See Pans, Fry.

Fuse— Per 1000 Feet.

Hemp \$2.75
Cotton 3.20
Waterproof Sgl. Taped. 3.65
Waterproof Dbl. Taped. 4.40
Waterproof Tpl. Taped. 5.15

Gates, Molasses and Oil—

Stebbins' Pattern 80&10%

Gauges—

Marking, Mortise, &c. 50&50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c. 50&50&10%
Diston's Marking, Mortise, &c. 67%
Stanley R. & L. Co.'s Butt and Rabbit Gauge 50%
Marking and Mortise 50%
Wire, Brown & Sharpe's 33 1/3%
Wire, Morse's 25%
Wire, P. S. & W. Co. 30%

Glimets— Single Cut—

Numbered assortments, per gross.

Nail, Metal, No. 1, \$2.00; 2, \$2.30
Spike, Metal, No. 1, \$1.00; 2, \$1.30
Nail, Wood Handled, No. 1, \$2.30; 2, \$2.60
Spike, Wood Handled, No. 1, \$1.30; 2, \$1.60

Glass, American Window

See Trade Report.

Glasses, Level—

Chapin-Stephens Co. 65&65&10%

Glue, Liquid Fish—

Bottles or Cans, with Brush 25&10&50%

International Glue Co. (Martin's) 40%

Grease, Axle—

Common Grade gro. \$4.50&6.00

Dixon's Everlasting, 10-lb pails, ea. 50¢; in boxes, 1/2 doz., 1 lb. \$1.20;
2 lb. 25%

Helmet Hard Oil 25%

Griddles, Soapstone—

Pike Mfg. Co. 33 1/3&33 1/3&10%

Grindstones—

Pike Mfg. Co.:
Improved Family Grindstones, 1/2 inch, 1/2 doz., \$2.00 33 1/3%
Royal Mfg. Co.:
Alumund Grinding Machines, each, Nos. 01, \$1.75; 1A, \$2.50; 10, \$5.00
Alumund Sickle Grinders, each, Nos. 20A, \$6.00; 20A Combined, \$6.50
Alumund Disc Grinders, each, \$2.50 30%

Grips, Nipple—

Perfect Nipple Grips 40&10&2%

Halters and Ties—

Cow Ties 60&50&60&10%

Covert Mfg. Co.:
Web 30&2%
Jute Rope 35%
Sisal Rope 25%
Cotton Rope 45%
Hemp Rope 45%
Oneida Community:
Am. Coll and Halters 40&40&5%
Am. Cow Ties 45&50%
Niagara Coll and Halters 45&50&5%
Niagara Cow Ties 45&50&10&5%

Hammers—

Handled Hammers—

Heller's Machinists' 55&10&55&10&5%
Heller's Farriers' 40&50&10&10&5%
Magnetic Tack, Nos. 1, 2, 3, \$1.25, \$1.50, \$1.75 50%
Peck, Stow & Wilcox, Steel 50%
Payette's Plumb:
E. Nail 40&25&40&12%
Eng. and B. S. Hand 50&12%
Machinists' Hammers 50&15&60&5%
Rivet and Tinner's 40&25&40&12%
Vaughan & Bushnell Mfg. Co.:
A. E. Nail 40&25&40&12%
Machinists' 50&15&60&5%

Heavy Hammers and Sledges—

Under 3 lb., per lb., 50¢, 80¢&50¢ %
3 to 5 lb., per lb., 40¢, 80¢&50¢ %
Over 5 lb., per lb., 30¢ %
Wilkinson's Smiths' lb. 9 1/2&10 1/2

Handles—

Agricultural Tool Handles
Aze, Pick, &c. 60&10&60&10&5%
Hoe, Rake, &c. 40&45&5%
Fork, Shovel, Spade, &c. 40%
Long Handles 40&45&5%
D Handles 40%

Cross-Cut Saw Handles—

Atkins 40%
Champion 40%
Diston's 40%

Mechanics' Tool Handles—

Auger, assorted gro. \$2.50&3.00
Brad Acl. \$1.65&1.75
Chisel Handles, Ass'd, per gross:
Tanged Firmer, Apple, \$2.40&2.65; Hickory, \$2.15&2.40
Socket Firming, Apple, \$1.75&1.95; Hickory, \$1.45&1.60
Socket Framing, Hickory, \$1.60&1.75
File, assorted gro. \$1.50&1.40
Hammer, Hatchet, &c. 60&10&60&10&5%

Hand Saw, Varnished, doz. 80¢&5¢; Not Varnished, 65¢&75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted, 75¢
Fore, doz. 45¢; Fore, Bolted, 90¢
Chapin-Stephens Co.:
Carving Tool 40&40&10%
Chisel 60&65&10%
File and Awl 65&65&10%
Saw and Plane 40&40&10%
Screw Driver 40&40&10%
Millers Falls Adj. and Hatchet Auger Handles 20&10%
Nicholson Simplicity File Handle 30%
W. A. Zehner Supply Co.:
Hammer, per doz., 12 in., \$2.00;
14 in., \$2.00; 16 in., \$2.30; 18 in., \$2.50; 20 in., \$2.70; 22 in., \$3.00;
24 in., \$3.30; 26 in., \$3.50; 30 in., \$3.80
Sledge, per doz., oval 30 in., \$3.80;
octagon, 30 in., \$3.80; oval 36 in., \$4.00; octagon, 36 in., \$4.30
Axe, per doz., 28 to 34 in., \$5.60;
36 in., \$5.80
Adze, per doz., 36 in., \$5.80; 36 in., \$7.80
Pick, per doz., R. R., 36 in., \$8.00;
coal 34 in., \$5.80
Hatchet, per doz., 12 to 14 in., \$2.00

Hangers—

NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.

Allith Mfg. Co.:
Reliable, No. 1; Allith, No. 3; A1-
With Adjustable, No. 6; Reliable
Parlor Door 50%

Chicago Spring Butt Co.:

Friction 25%
Osculating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle 60&10%
Roller Bearing 70%
Griffin Mfg. Co.:
Solid Axle, No. 10, \$12.00 70%
Roller Bearing, No. 11, \$15.00 70%
Roller Bearing, Ex. Hy., No. 22, \$18.00 70%
Hinged Hangers, \$16.00 60&10%
Lane Bros. Co.:
Parlor, Ball Bearing, \$1.00;
Standard, \$3.15; No. 105, \$2.85;
New Model, \$2.80; New Cham-
pion \$2.25
Barn Door, Standard 60&5%
Hinged net \$6.08
Covered 60&2%
Special 70&5%
Lawrence Bros.:
Advance and Sterling 60&2%
Cleveland and Peerless 70&5%
Clipper, No. 75 60&5%
Crown 60&2%
Cyclone-Tandem net \$7.50
Easy Parlor Door, Dbl. Sets, \$2.50; Single Sets, \$1.25 60%
Giant 70&7 1/2%
Hummer 70&7 1/2%
New Cyclone, Flexible, \$16.00 60&2%
New York 60&2%
McKinney Mfg. Co.:
No. 1, Special, \$15 60&10%
No. 2, Standard, \$18 60&10%
Hinged Hanger, \$16 50%
Meyers' Stayon Hangers 60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

Regular list, first qual. 40&7 1/2¢—
Second quality 50&10&2%

Hatchets—

Clark No. 5 \$1.75; No. 8B, \$2.00; No. 3, \$2.75; No. 3D, \$2.75; No. 7D, \$3.00;
No. 3E, \$3.25; No. 1, \$3.50 25%
Clark Coal, 1/2 doz., \$0.75 20%

Hinges—

Blind and Shutter Hinges—
Surface Gravity Locking Blind—
(Victor); National; 1868 O. P.;
Niagara; Clark's O. P.;
Clark's Tip; Buffalo 1 3 5
Doe pair \$0.75 1.35 2.70

Mortise Shutter:

(L. & P., O. S., Dixie, &c.)

No. 1 1 1/2 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Doe pair \$0.70 .65 .60 .55

Mortise Reversible Shutter (Buf- falo, &c.):

No. 1 1 1/2 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Doe pair \$0.70 .65 .60 .55

North's Automatic Blind Fixtures,
No. 2, for wood, \$9.00; No. 3, for
brick,

Masons' Etc.
Cleveland Wire Spring Co.:
Steel Brick, No. 162, each \$1.05
Steel Mortar, No. 158, each \$1.35
Hoes—Eye
Scovill and Oval Pattern.....
60¢10¢10¢10¢10¢

Grub, list Feb. 23, 1899.....
70¢10¢75¢10¢
D. & H. Scovill.....
70¢10¢75¢10¢

Handled
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobs are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding, No. 1, \$2.75; No. 2, \$2.50
Star Double Bit.....\$3.20
Ft. Madison Cotton Hoe.....\$3.35
Ft. Madison Crescent Cultivator Hoe.....
doz.....\$3.10
Ft. Madison Mattock Hoe.....
doz.....\$3.10
Regular Weight.....doz. 66¢
Junior Size.....doz. \$4.00
Ft. Madison Sprouting Hoe.....doz. \$4.00
Ft. Madison Dixie Tobacco Hoe.....
75¢10¢75¢
Kretzinger's Cut Easy.....45¢10¢
Warren Hoe.....75¢2¢
W. & C. Ivanhoe.....\$3.15
B. B. 6 in., Cultivator Hoe.....\$3.15
B. B. 6 in., do.....\$3.15
Acme Weeding.....doz. \$4.85
W. & C. L. T. Shrub Hoe.....doz. \$4.85

Hoisting Apparatus
See Machines, Hoisting.
Holders—Bit
Angular, do doz. \$24.00.....45¢10¢

Door
Bardale's, Iron, 40%; Brass and Bronze.....33½¢
Empire.....50¢
Pullman.....35¢
Superior.....33½¢

File and Tool
Nicholson File Holders and File Handles.....33½¢40¢

Fruit Jar
Triumph Fruit Jar Holder, do gross, \$10.80; do doz. \$1.25

Trace and Rein
Fernald Double Trace Holder, do doz. pairs.....\$1.25
Dash Rein Holder, do doz. pairs.....\$1.25

Hones—Razor
Pike Mfg. Co., Belgian, German and Swaty.....40¢

Hooks—Cast Iron
Bird Cage, Reading.....40¢
Clothes Line, Reading List.....40¢
Clothes Line, Stowell's.....70¢
Coat and Hat, Reading.....45¢20¢
Coat and Hat, Stowell's.....70¢
Coat and Hat, Wrightville.....65¢
Harness, Reading List.....40¢
Harness, Stowell's.....60¢
School House, Stowell's.....70¢

Wire
Belt.....80¢
Wire C. & H. Hooks.....75¢75¢10¢

Columbian Hdw. Co., Gem.....70¢45¢
Parker Wire Goods Co., Kings.....70¢10¢
Western W. G. Co. Molding.....75¢
Wire Goods Co.: Chief, 70%; Crown, 75%; Czar, 65%; V. Brace, 75%; Czar Harness, 50¢10¢

Wrought Iron
Boz, 6 in., per doz., \$1.00; 8 in., \$1.25; 10 in., \$1.50
Cotton.....doz. \$1.05¢1.25
Wrought Staples, Hooks, &c.—See wrought Goods

Miscellaneous
Hooks, Bench, See Stops, Bench.
Bush, Light, do \$1.75; Medium, \$5.35; Heavy, \$6.25
Grass, best, all sizes, per doz. \$1.60
Grass, common grades, all sizes, per doz.....\$1.30
Whiffletree.....lb. 5¢4¢

Hooks and Eyes
Brass.....60¢50¢10¢45¢
Malleable Iron.....70¢70¢10¢
Corset Mfg. Co. Gate and Scuttle Hooks.....40¢
Ft. Madison Cut-Easy Corn Hooks.....doz. \$3.25 net
Turner & Stanton Co. Cup and Shoulder.....80¢10¢10¢
Bench L. Hooks—See Bench Stops.
Cord Hooks—See Knives, Corn.

Horse Nails
See Nails, Horse.

Horseshoes
See Shoes, Horse.

Hose, Rubber
Garden Hose, ½-inch:
Competition.....ft. 5 @ 6¢
5-ply Guaranteed, ft. 8 @ 9¢
4-ply Guaranteed, ft. 10 @ 11¢
Cotton Garden, ½-in., coupled:
Low Grade.....ft. 8 @ 9¢
Fair Quality.....ft. 10 @ 11¢

Irons—Sad
From 1 to 19.....lb. 3¢14¢
B. B. Sad Irons.....lb. 3¢14¢
Mrs. Potts', cents per set:
Nos. 50 55 60 65
Jan'd Tops.....80 77 90 88
Tin'd Tops.....85 82 95 88
New England Pressing, lb. 8¢14¢

Pinking
Pinking Irons.....doz. 80¢
See Copiers.

Jacks, Wagon
Covert Mfg. Co.:
Auto Screw.....30¢2½¢; Steel, 45¢
Lockport.....30¢10¢45¢
Lane's Steel.....30¢10¢45¢
Richards' Tiger Steel, No. 130.....50¢10¢
Smith & Hemenway Co.'s.....35¢

Kettles
Brass, Spun, Plain.....20¢35¢

Enameled and Cast Iron—See Ware, Hollow.

Knives
Butcher, Kitchen, &c.—
Foster Bros. Butcher, &c.....37¢
Wilkinson Shear & Cutlery Co.....60¢

Corn
Wilkinson Shear & Cutlery Co.:
Wilcut Brand Knives and Hooks 50¢
Withington Acme, do doz. \$2.65
Dent, \$2.75; Adj. Serrated, \$2.20
Serrated, \$2.10; Yankee No. 1, \$1.50
Yankee No. 2, \$1.15

Drawing
Standard List.....75¢45¢75¢10¢
C. E. Jennings & Co., Nos. 45, 46, 60
Jennings & Griffin, Nos. 41, 42, 75
Swan's.....33½¢
Watrous.....16½¢
L. & J. White.....20¢50¢25¢

Hay and Straw
Serrated Edge, per doz. \$5.50¢5.75
Iwan's Sickle Edge.....doz. \$5.50
Iwan's Serrated.....doz. \$10.00

Mincing
Buffalo.....do gro. \$13.00

Miscellaneous
Farmers'.....doz. \$3.00¢3.25
Worstenholms.....doz. \$3.00¢3.25

Knobs
Base, ½-inch, Birch, or Maple,
Rubber Tip.....gro. \$1.25¢1.40
Carriage, Jap., all sizes.....

Door, Mineral.....gro. 10¢45¢
Door, Por. Jap'd.....doz. 70¢75¢
Door, Por. Nickel.....doz. \$2.05¢1.15
Bardale's Wood Door, Shutters, &c. 15¢

Lacing, Leather
See Belting, Leather.

Ladders, Store, &c.
Allith Mfg. Co., Reliable.....50¢
Lane's Store.....45¢
Myers' Noiseless Store Ladders.....45¢
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50¢
Climax Shelf, No. 113.....50¢
Trolley, No. 109.....50¢

Ladies, Melting
L. & G. Mfg. Co. (low list).....25¢
P. S. & W.....40¢10¢
Reading.....60¢

Lanterns—Tubular
Regular, No. 0.....doz. \$4.35¢4.50
Slide Lift, No. 0.....doz. \$1.60¢1.75
Hinge Globe, No. 0.....doz. \$4.60¢4.75
Other Styles.....40¢40¢10¢

Bull's Eye Police
3-inch.....\$4.25¢4.50

Lasts and Stands, Shoe
Stowell's Atlas, Malleable Iron.....50¢
Stowell's Badger, Cast Iron.....50¢

Latches—Thumb
Roggins' Latches, with screw.....doz. 35¢40¢

Door
Allith Mfg. Co., Automatic, No. 400.....doz. \$4.00
Cronk & Carrier Mfg. Co., No. 101.....doz. \$2.30
Cronk & Carrier Mfg. Co., Latch, Hasp and Staples.....50¢
Richards' Bull Dog, Heavy, No. 125.....50¢45¢
Richards' Trump, No. 127.....\$1.50
Stowell's Steel.....50¢

Leaders, Cattle
Small.....doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20¢

Lifters, Transom
R. & E.....10¢

Lines
Wire Clothes, Nos. 18 19 20
100 feet.....\$2.25 2.00 1.75
75 feet.....\$1.75 1.55 1.10
Anniston Waterproof Clothes, 50 ft., do gro. \$25.00; Gilt Edge \$23.00; Air Line, \$23.00; Acme, \$18.00; Alabama, \$17.00; Empire, \$16.00; Advance, \$14.00; Eclipse, \$13.50; Chicago, \$11.50; Standard, \$10.50; Columbia, \$9.50; Allston, \$13.50; Calhoun, \$12.00

Samson Cordage Works
Solid Braided Chalk, Nos. 0 to 3, 40¢
Solid Braided Masons'.....30¢
Silver Lake Braided Chalk, No. 0, \$6.00; No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, \$1.50; No. 4, \$2.00; No. 4½, \$2.50; Colors, No. 3½, \$1.75; No. 4, \$2.25; No. 4½, \$2.75; Linen, No. 3½, \$2.50; No. 4, \$3.50; No. 4½, \$4.50
Tent and Awning Lines: No. 5, White Cotton, \$7.50; Drab Cotton, \$8.50
Clothes Lines, White Cotton: 50 ft., \$2.75; 60 ft., \$3.25; 70 ft., \$3.75; 75 ft., \$4.00; 80 ft., \$4.25; 90 ft., \$4.75; 100 ft., \$5.25
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines.....40¢
Clothes Lines, White Cotton.....20¢
Shade Cord, Cotton or Linen.....20¢

Locks—Cabinet
Cabinet Locks.....\$3½¢
Door Locks, Latches, &c
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co.....40¢
R. & E. Mfg. Co.....10¢
Stowell's.....50¢

Padlocks
R. & E. Mfg. Co. Wrought Steel and Brass.....75¢10¢

Sash, &c.
Ives' Patent:
Bronze and Brass, 60%; Crescent, 40¢20¢; Iron, 60%; Window Ventilating, 55%; Robinson Pat. Ventilating Sash Lock, 33½¢; Wrought Bronze and Brass, 55%; Wrought Steel, 55¢.

Pullman Patent Ventilating Lock.....35¢
Reading.....40¢

Machines—Boring
Com. Up'r't, without Augers.....\$2.00¢2.25
Com. Ang'l'r, without Augers.....\$2.25¢2.50
Swan's Improved.....40¢10¢
Jennings' Nos. 1 and 4.....33½¢
Muller's Falls.....5.75
Snell's Upright, \$2.65; Angular, \$2.90

Corking
Reisinger Invincible Hand Power.....doz. \$18.00

Fence
Williams' Fence Machines.....each, \$5.50

Hoisting
Moore's Anti-Friction Chain Hoist.....30¢
Moore's Hand Hoist, with Lock.....20¢
Moore's Cyclone High Speed Chain Hoist.....25¢

Ice Cutting
Chandler's.....12½¢

Washing
Ross Washing Machine Co.: Per doz. Ross No. 1.....\$57.00
Ross Rotary.....\$57.00
Champion Rotary Banner No. 1.....\$50.00
Standard Champion No. 1.....\$27.00
Cincinnati Square Western.....\$33.00
Uneda American, Round.....\$33.60

Mallets
Hickory.....45¢50¢
Lignumvite.....45¢50¢
Timbers' Hickory and Applewood.....45¢50¢

Mangers, Stable
Sweet Iron Works.....50¢

Mashers, Vegetable
Western, W. G. Co., Potato.....60¢10¢

Mats, Door
Elastic Steel (W. G. Co.), new list.....50¢
Keystone Wire Matting Co.:
Keystone.....50¢
Ideal.....50¢

Mattocks
See Picks and Mattocks.

Milk Cans—See Cans, Milk.

Mills, Coffee, &c.
Enterprise Mfg. Co.....20¢25¢
National list Jan. 1, 1902.....30¢
Parker's Columbia & Victoria.....50¢10¢60¢
Parker's Box and Side.....50¢10¢60¢
Swift, Lane Bros. Co.....30¢

Motors Water
Divine's Red Devil.....30¢

Mowers, Lawn
NOTE.—Net prices are generally quoted
Cheapcut.....all sizes, \$1.85¢2.00
Cheap.....all sizes, \$2.00¢2.50
Better Grade.....all sizes, \$2.50¢4.50
12 14 16 18-in.
High Grade.....\$4.50 4.75 5.00 5.25
Continental.....60¢
Great American.....70¢
Great American Ball B'g, new list.....70¢
Quaker City.....70¢
Pennsylvania, Jr., Ball Bearing, 50¢10¢5¢
Pennsylvania Golf.....50¢
Pennsylvania Pony.....33½¢5¢
Pennsylvania Horse.....40¢5¢
Granite State:
Style A, Low Wheel.....70¢10¢10¢
Style B, Low Wheel.....70¢10¢
Style C, High Wheel, spl. disc., 70¢10¢
Style D, High Wheel, spl. disc., 70¢10¢
Philadelphia:
Styles M., S., C., K., T.....70¢10¢5¢
Style A, All Steel.....60¢10¢5¢
Style E, High Wheel.....10¢10¢5¢
Drexel and Gold Coin, special list 40¢
Horse.....40¢5¢
36-in. Horse.....30¢10¢
Eagle Horse.....30¢5¢
I. X. L. Horse.....50¢

Nails
Wire Nails and Brads, Miscellaneous.....87½¢87½¢40¢
Cut and Wire. See Trade Report.
Hungarian Finishing, Upholsterers' &c. See Tacks.

Horse
Nos. 17 8 10 10
Anchor.....23 21 20 19 18.....40¢5¢
Chaplain.....28 26 25 24 23.....50¢
Coleman.....13 12 12 11 11.....net
New Haven.....23 21 20 19 18.....40¢5¢
Livingston.....19 18 17 16 16.....10¢
Western.....do 8¢
Jobbers' Special Brands.....per lb. 0¢10¢

Picture
Brass H'd. 15 55 50 50 50 ..gro
Por. Head.. 1.10 1.10 1.10 ..gro

Nippers
See Pliers and Nippers.

Nuts
Cold Punched: Off Hat.
Square, Blank or Tapped.....\$1.80¢
Hexagon, Blank or Tapped.....\$1.00¢
Square, B'K, C. T. & R.....\$1.00¢
Hexagon, B'K, C. T. & R.....\$1.00¢
Hot Pressed:
Square, Blank.....5.00¢
Hexagon, Blank.....5.40¢
Square, Tapped.....4.70¢
Hexagon, Tapped.....5.10¢

Oakum
Rest.....lb. 6½¢
U. S. Navy.....lb. 6¢
Navy.....lb. 5¢
Plumbers' Spun Oakum.....3½¢
In carload lots ¼ lb. off, f.o.b. New York.

Oil Tanks—See Tanks, Oil.

Oilers
Brass and Copper.....50¢10¢
Tin or Steel.....65¢10¢50¢70¢
Zinc.....65¢10¢50¢70¢

Chase or Paragon
Brass and Copper.....50¢10¢
Tin or Steel.....65¢10¢
Zinc.....65¢10¢
Malleable, Hammers' Improved, Nos. 1, 12 and 13, 20%; Old Pattern, Nos. 1, 2, 3, 50¢
American Tube & Stamping Co.:
Spring Bottom Cans.....70¢70¢10¢
Railroad Oilers, &c.....60¢60¢10¢

Openers—Can—Per doz.
Sprague, Iron Handle.....30¢35¢
Sprague, Wood Handle.....35¢40¢
Sardine Scissors.....\$1.35¢1.00
Vim Tin Shear and Can Opener.....do doz. 75¢; per gro. \$7.50
Yankee Can and Bottle Opener, do doz., net.....\$0.75

Egg
Nickel Plate, do doz., \$2.00; Silver Plate, \$4.00.

Packing
Asbestos Packing, Wick and Rope.....20¢25¢
Rubber—
(Fair quality goods.)
Sheet, C. I.....11¢12¢
Sheet, C. O. S.....11¢12¢
Sheet, C. B. S.....12¢13¢
Sheet, Pure Gum.....10¢45¢
Sheet, Red.....10¢50¢
Jenkins' 36, 38, 40.....25¢

Miscellaneous
American Packing.....lb. 7¢10¢
Cotton Packing.....lb. 16¢23¢
Italian Packing.....lb. 9¢12½¢
Jute.....lb. 14¢15¢
Russia Packing.....lb. 8¢11¢

Pails, Creamery
R. M. Co., with gauges, do doz., No. 1, \$6.25; No. 2, \$6.50.

Pails, Water, Well, &c.
See Buckets.

Pans—Dripping
Standard List.....70¢10¢75¢
Edwards, Royal Blue.....65¢7½¢

Fry
Common Lipped:
Nos. 1 2 3 4 5
Per doz. \$0.75 0.80 0.90 1.10 1.30
Refrigerator, Galva.....
Inch.....12 14 16 18
Per doz. \$1.75 2.25 2.80 3.15

Roasting and Baking
Real, H. M. Co., do doz., Nos. 5, \$1.50; 10, \$3.25; 20, \$5.75; 30, \$8.25; Savory, do doz., net, Nos. 20, \$9.00; 40, \$15.00.
Simplex, do gro.:
No. 40 50 60 140 150 160
\$30.00 35.00 42.00 34.00 39.00 46.00

Paper—Building Paper
Asbestos.....lb.
Roll Board or Building Felt,
6 to 30 lb., per 100 sq. ft. 3½¢10¢
Roll Board or Building Felt,
3-32 and ¼ in., 45 to 60 lb.,
per 100 sq. ft. 6¢
Mill Board, Sheet, 40 x 40 in.,
1-32 to ½ in. 3¢15¢
Per roll
Eosin Sized Sheathing: 500 sq. ft.
Light weight, 25 lbs. to roll
40¢50¢
Medium weight, 30 lbs. to roll,
50¢55¢
Heavy weight, 40 lbs. to roll,
65¢70¢

Black Water Proof Sheathing
500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, \$1.10; 4 ply, \$1.25.
Defensing Felt, 9, 6 and 4½ sq. ft. to lb. ton.....\$50.00
Red Roofing, 250 sq. ft. per roll.....\$1.75

Tarred Paper
1 ply (roll 400 sq. ft.), ton.....\$31.00¢35.00
2 ply, roll 108 sq. ft.57¢
3 ply, roll 108 sq. ft.80¢
Slater's Felt (roll 500 sq. ft.), 70¢

Sand and Emery
Flint Paper and Cloth.....50¢10¢
Garnet Paper and Cloth.....25¢
Emery Paper and Cloth.....50¢10¢60¢

Parers—Apple
Advance.....do doz. \$1.00
Baldwin.....do doz. \$1.00
Bonanza Improved.....each \$6.50
Daisy.....do doz. \$1.00
Eureka Improved.....each \$20.00
Family Bay State.....do doz. \$15.00
Improved Bay State.....do doz. \$36.00
Little Star.....do doz. \$5.00
New Lightning.....do doz. \$7.00
Reading 75.....do doz. \$3.25
Rocking Table.....do doz. \$6.25
Turn Table.....do doz. \$6.00
White Mount.....do doz. \$5.00

Potato
Saratoga.....do doz. \$7.00
White Mountain.....do doz. \$6.00

Picks and Mattocks
List, Feb. 23, 1899. 70¢45¢70¢10¢
Cronk's Handled Garden Mattock, do doz., No. 2, \$2.60; No. 3, \$6.40.

Pinking Irons
See Irons, Pinking.

Pincers
Vaughan & Bushnell Mfg. Co.:
Blacksmiths' per doz., 10 in., \$5.00; 12 in., \$5.50; 14 in., \$6.00.
Carpenters' Claw per doz., 6 in., \$2.00; 8 in., \$2.75; 10 in., \$3.50.

Sausage Stuffers or Fillers

See Stuffers or Fillers, Sausage.
Saw Frames—
 See Frames, Saw.
Saw Sets— See Sets, Saw.
Saw Tools— See Tools, Saw.
Saws—

Atkins:	
Circular	45%
Band	50% to 50¢
Butcher Saws	50%
Cross Cuts	35%
One-Man Cross Cut	40%
Narrow Cross Cut	50%
Hand, Rip and Panel	35¢ to 50¢
Miter Box and Compass	45%
Mulay, Mill and Drag	45%
Compu-Stephens Co.:	
Turning Saws and Frames	30¢ to 10¢
Diamond Saw & Stamping Works:	
Sterling Kitchen Saws	30¢ to 10¢
Dunston:	
Irregular, Solid and Inset Tooth	50%
Band, 2 to 15 in. wide	60%
Band, 1/4 to 1 1/2	60%
Crosscuts	45%
Narrow Crosscuts	50%
Mulay, Mill and Drag	45%
Framed Woodsaws	25%
Woodsaw Blades	25%
Woodsaw Rods, Tinned	15%
Hand Saws, Nos. 12, 90, 9, 16, 4100,	
D8, 120, 76, 7, 8	25%
Hand Saws, Nos. 7, 107, 127 1/2, 3, 1,	
0, 60, Combination	25%
Compass, Key Hole, &c.	30%
Butcher Saws and Blades	30%
C. E. Jennings & Co.'s:	
Back Saws	25%
Butcher Saws	30%
Compass and Key Hole Saws	35¢
Framed Wood Saws	25%
Hand Saws	30¢ to 25¢
Wood Saw Blades	35%

Millers Falls:	
Butcher Saws	15¢ to 10¢
Star Saw Blades	15¢ to 10¢
Massachusetts Saw Works:	
Victor Kitchen Saws	40¢ to 10¢
Butcher Saws and Blades	35¢ to 40¢
Peace & Richardson's Hand Saws	30%
Simonds:	
Circular Saws	45%
Crescent Ground Cross Cut Saws	30%
One-Man Cross Cut	40¢ to 10¢
Gang Mill, Mulay and Drag Saws	45%
Band Saws	50%
Back Saws	25¢ to 15¢
Butcher Saws	35¢ to 15¢
Hand Saws	25¢ to 15¢
Hand Saws, Bay State Brand	30¢ to 10¢
Compass, Key Hole, &c.	25¢ to 15¢
Wood Saws	40¢ to 15¢
Wheeler, Madden & Clemens Mfg.	
Co.'s Cross Cut Saws	50%

Hack Saw Blades and Frames—	
Atkins' Hack Saw Blades A & A	25%
Atkins:	
Concave Blades	25%
Keystone Blades	35%
Hack Saw Frames	30%
Simonds:	
File Co.	35%
C. E. Jennings & Co.'s:	
Hack Saw Frames, Nos. 175, 180,	
comp.	40¢ to 15¢
Hack Saws, Nos. 175, 180, comp.	
Goodell's Hack Saw Blades	40¢ to 10¢
Griffin's Hack Saw Frames	35¢ to 10¢
Griffin's Hack Saw Blades	35¢ to 10¢
Star Hack Saws and Blades	15¢ to 10¢
Sterling Hack Saw Blades	30¢ to 10¢
Sterling Hack Saw Frames	30¢ to 10¢
Sterling Power Hack Saw Machines,	
each, No. 1, \$25.00; No. 2, \$30.00	10%
Victor Hack Saw Blades	25%
Victor Hack Saw Frames	40%

Scroll—	
Barnes, No. 7, \$15	35%
Barnes' Scroll Saw Blades	40%
Barnes' Velocipede Power Scroll Saw,	
without boring attachment, \$12	25%
with boring attachment, \$20	25%
Lester, complete, \$10.00	15¢ to 10¢
Rogers, complete, \$3.50 and \$4.00	15¢ to 10¢

Scales—	
Family, Turnbull's	50¢ to 50¢ to 10%
Counter:	
Hatch, Platform, 1/4 oz. to 4	
lbs.	dos. \$5.50
Two Platforms, 1/4 oz. to 8	
lbs.	dos. \$10.00
Union Platform, Plain \$1.70 to \$1.80	
Union Platform, Stpd. \$1.85 to \$1.95	
Chattillon:	
Eureka	25%
Favorite	40%
Crocker's Trip Scales	50%
Chicago Scale Co.:	
The Little Detective	25 lbs 50%
Union or Family No. 2	50%
Portable Platform (reduced list)	50%
Wagon or Stock (reduced list)	50%
The Standard Portables	45%
The Standard R. R. and Wag-	
on	50¢ to 10%

Scrapers—	
Box, 1 Handle	dos. \$2.00 to \$2.25
Box, 2 Handle	dos. \$2.50 to \$2.80
Ship	Light, \$2.00; Heavy, \$1.50
Adjustable Box Scraper (R. R. & L.	
Co.), \$5.00	45%
Compu-Stephens Co. Box	30¢ to 10¢

Screws—Bench and Hand	
Bench, Iron, dos. 1 in., \$2.50 to	
2 7/8; 1 1/4, \$3.00 to \$3.25; 1 1/2, \$3.50 to \$3.75	
Bench, Wood	20¢ to 20¢ to 10%
Hand, Wood	20¢ to 20¢ to 10%
B. Bliss Mfg. Co. Hand	30¢ to 10¢ to 10%
Chapin-Stephens Co. Hand	20%
Coach, Lag and Hand Rail—	
Lag, Cone Point, List Oct. 1,	
'99	75¢ to 15%
Coach, Gimlet Point, List	
Oct. 1, '99	75¢ to 10%
Hand Rail, List Jan. 1, '01	75¢ to 10%

Jack Screws—	
Standard List	70¢ to 10¢ to 75%
Millers Falls	50¢ to 10¢ to 10%
P. S. & W.	50%
Swett Iron Works	75¢ to 80%

Machine—	
List Jan. 1, '98:	
Flat or Round Head, Iron,	
Brass or Bronze	50¢ to 50¢ to 10%
Fillister Head, Iron, Brass or	
Bronze	30¢ to 10¢ to 10%

Set and Cap—	
Set (Iron)	75¢ to 10¢ to 7 1/2%
Set (Steel), net advance over	
Iron	25%
Sq. Hd. Cap	70¢ to 10¢ to 7 1/2%
Hex. Hd. Cap	70¢ to 10¢ to 7 1/2%
Rd. Hd. Cap	50¢ to 7 1/2%
Fillister Hd. Cap	60¢ to 7 1/2%

Wood—	
List July 23, 1903:	
Flat Head, Iron	87¢ to 45¢
Round Head, Iron	85¢ to 45¢
Flat Head, Brass	82¢ to 45¢
Round Head, Brass	80¢ to 45¢
Flat Head, Bronze	77¢ to 45¢
Round Head, Bronze	75¢ to 45¢
Drive Screws	87¢ to 45¢

Scroll Saws—	
See Saws, Scroll.	
Scythes—	
Per doz.	
Grass, No. 1, Plain	\$6.25 to \$6.75
Clipper, Bronzed Web	\$6.50 to \$7.00
No. 3 Clipper, Pol'd Web	\$6.75 to \$7.25
No. 6 Clipper and Solid Steel,	
per doz.	\$7.00 to \$7.50

Bush, Weed and Bramble No. 2,	
per doz.	\$6.50 to \$7.00
Grain, No. 1	\$3.25 to \$3.75
Bronzed Web, No. 1	\$3.50 to \$4.00
Nos. 3 and 4 Clipper, Grain	\$3.75 to \$4.25
Solid Steel, No. 6	\$3.25 to \$3.75

Seeders, Raisin—	
Enterprise	25 to 30%
Sets—Awl and Tool—	
Fray's Adj. Tool Handles, No. 1, \$12;	
2, \$18; 3, \$12; 4, \$9; 5, \$7	50%
C. E. Jennings & Co.'s Model Tool	
Holders	30%
Millers Falls Adj. Tool Handles, No.	
1, \$12; No. 4, \$12; No. 5, \$15	15¢ to 10%

Garden Tool Sets—	
Ft. Madison Three Poles, Hoe, Rake	
and Shovel	per doz sets \$9.00
Sets, Nail—	
Octagon	gro. \$3.50 to \$3.75
Hand Bros	27 1/2%
Cannon's Diamond Point, per doz.	\$12

Mayhew's	
Snell's Corrugated Cup Pt.	per doz \$9.00
Snell's Knurled, Cup Pt.	40¢ to 10%
Victor Knurled Cup Pt.	per doz \$7.50
Rivet—	
Regular list	75 to 75¢ to 10%

Saw—	
Atkins:	
Criterion	40%
Adjustable	40%
Dunston's Star, Monarch and Tri-	
umph	30%
Morrill's No. 1	\$15.00
Nos. 3 and 4, Cross Cut	\$20.00
No. 5, Mill	\$30.00
Nos. 10, 11, 95	\$15.00
No. 1 Old Style	\$10.00
Special	\$12.25
Giant Royal Cross Cut	per doz \$8.00
Royal, Hand	per doz \$4.50
Taintor Positive	per doz \$4.75

Shaving	
Fox Shaving Sets, No. 30	per doz, net, \$24.00
Smith & Hemenway Co.'s	60%
Sharpeners, Knife—	
Chicago Wheel & Mfg. Co.	70%
Pike Mfg. Co.:	
Fast Cut Pocket Knife Hones	\$1.50
Mounted Kitchen Sand Stone	\$1.50
per doz.	\$1.50
Natural Grit Carving Knife	\$3.00
Hones, per doz.	\$3.00
Quick Cut Emery Carving	\$1.50
Knife Hones, per doz.	\$1.50
Quick Edge Pocket Knife	\$2.50
Hones, per doz.	\$2.50

Skate—	
Smith & Hemenway Co., Eureka	20%
Shaves, Spoke—	
Iron	dos. \$1.10 to \$1.25
Wood	dos. \$1.75 to \$2.25
Bailey's (Stanley R. & L. Co.)	45%
Razor Edge (Stanley R. & L. Co.)	
Iron, 50%; Wood	55%
Chapin-Stephens Co.	30¢ to 10¢
Goodell's	per doz \$0.00
Wood's F1 and F2	50%

Shears—	
Cast Iron	7 8 9 in.
Best	\$16.00 18.00 20.00 gro.
Good	\$13.00 15.00 17.00 gro.
Cheap	\$5.00 6.00 7.00 gro.
Straight Trimmers, &c.	
Best quality Jap.	70 to 70¢ to 10%
Best quality, Nickel	60 to 60¢ to 10%
Fair quality, Jap.	60 to 60¢ to 10%
Fair quality, Nickel	75 to 75¢ to 10%
Tailors' Shears	40 to 40¢ to 10%
Acme Cast Shears	40 to 40¢ to 10%
Heinrich's Tailor's Shears	10%
Wilkinson Shear & Cutlery Co.:	
3200 list	30¢ to 10¢ to 10%
Grass	50 to 10%
Horse or Mule	50 to 10%

Tinners' Snips—	
Steel Blades	20¢ to 20¢ to 10%
Steel Laid Blades	40¢ to 10¢ to 50%
Forged Handles, Steel Blades, Berlin	
Heinrich's Snips	50%
Jennings & Griffin Mfg. Co.'s	50%
10 in.	50%
Niagara Snips	40%
P. S. & W. Forged Handles	20%

Pruning Shears—	
Cronk's Hand Shears	33 1/4%
Cronk's Wood Handle Shears	33 1/4%
Dunston's Combined Pruning Hook	per doz \$18.00
Dunston's Pruning Hook only, per	
\$12.00	25%

John T. Henry Mfg. Co.:	
Pruning Shears, all grades	40%
P. S. & W. Co.	30%
Wilkinson Shear & Cutlery Co.:	
Hedge, Wilcut Brand	60 to 10%
Lawn and Border, Wilcut Brand	60 to 10%

Sheaves—Sliding Door—	
Stowell's Anti-Friction	50%
Reading	40%
R. & E. list	15%
Wrightsville Hatfield Pattern	87 1/2%
Sliding Shutter—	
Reading list	40%
R. & E. list	10%

Shells, Empty—	
Brass Shells, Empty:	
Climax, 10 and 12 gauge	65 to 10%
Club, Rival, 65 to 5%; First Quality	60 to 5%
Paper Shells, Empty:	
New Rapid, 10, 12, 16 and 20 gauge	25 to 10%

Shells, Loaded—	
Loaded with Black Powder	40%
Loaded with Smokeless Powder,	
medium grade	40 to 5%
Loaded with Smokeless Powder,	
high grade	40 to 10 to 10%
Robin Hood:	
Smokeless Robin Hood, Low	
Brass	40 to 10%
Smokeless Comets, High Brass	40 to 10 to 10%
Indian, Black Powder	40 to 5%

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Loaded with Black Powder	40%
Loaded with Smokeless Powder,	
medium grade	40 to 5%
Loaded with Smokeless Powder,	
high grade	40 to 10 to 10%

Stoppers, Bottle—

Victor Bottle Stoppers.....gro. \$8.00

Stops—Bench—

Millers Falls.....15¢ 10¢

Morrill's, No. 1, \$10.00.....50¢

Morrill's, No. 2, \$12.50.....50¢

Door—

Chapin-Stephens Co.....60¢ 60¢ 10¢

Plane—

Chapin-Stephens Co.....20¢

Straps—Box—

Cary's Universal, case lots.....20¢ 10¢ 10¢

Stretchers, Carpet—

Cast Iron, Steel Points, doz.....60¢ 60¢ 10¢

Socket.....doz. \$1.00

Bullard, # doz.....\$4.00

Excelsior Stretcher and Tack Hammer Combined, # doz. \$6.00.....20¢

Woven Fence—

Franklin.....ea. \$3.75

Strops, Razor—

Star Diagonal Strop.....25¢

Stuffers, Sausage—

Enterprise Mfg. Co.....25¢ 25¢ 74¢

National Specialty Co., list Jan. 1, 1902.....30¢ 25¢

Sweepers, Carpet—

Bissell Carpet Sweeper Co., # doz. \$36.00

Superba, Crotch Mahogany.....\$36.00

Triumph, Fancy Veneers.....\$33.00

Parlor Queen, Figured Rosewood.....\$30.00

Elite, Hungarian Ash.....\$29.00

American Queen, Figured Mahogany.....\$27.00

Ideal, Bird's-Eye Maple.....\$25.00

Grand Rapids, Nickel.....\$24.00

Japan.....\$22.00

Standard, Nickel, \$22.00; Japan, \$20.00

Crown Jewel, Nickel.....\$21.00

Japan.....\$19.00

Crystal, Glass Top.....\$36.00

Grand, 17 in. wide.....\$34.00

Club, 24 in. wide.....\$34.00

Hall, 28 in. wide.....\$30.00

National Sweeper Co., # doz. \$40.00

Louis XV, Roller Bearing, Gold Plated.....\$120.00

Hepplewhite, Roller Bearing, Silver Plated.....\$72.00

Sheraton, Roller Bearing, N'kel. \$60.00

Ye Mission, Roller Bearing, Oxidized Copper.....\$36.00

Transparent, Roller Bearing, Plate Glass top, Nickle.....\$36.00

National Queen, Roller Bearing, Fancy Veneers.....\$27.00

Loyal, Roller Bearing, Veneers, Nickle.....\$25.00

Triple Medal, Roller Bearing, Nickle.....\$25.00

Marion, Roller Bearing, N'kel. \$24.00

Marion Queen, Roller Bearing, Nickle.....\$21.00

Monarch, Roller Bearing, N'kel. \$22.00

Monarch, Roller Bearing, Jap. \$20.00

Perpetual, Regular B'g, N'kel. \$20.00

Perpetual, Regular B'g, Jap. \$18.00

Monarch Extra (17 in. case), Roller Bearing, Nickle.....\$36.00

Monarch Extra (17 in. case), Roller Bearing, Japanned.....\$33.00

Auditorium (26 in. case), Roller Bearing, Nickle.....\$54.00

Mammoth (30 in. case), Roller Bearing, Nickle.....\$60.00

NOTE—Rebates: 50¢ per dozen on three-dozen lots; \$1 per dozen on five-dozen lots; \$2 per dozen on ten-dozen lots; \$2.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.

Eureka Japanned.....# doz. \$15.00

Model E, Sanitaire.....# doz. \$25.00

Model A, Sterling.....# doz. \$28.00

Model B, Sterling, Nickle.....# doz. \$23.00

Model B, Sterling, Japanned.....# doz. \$21.00

Model C, Sterling.....# doz. \$21.00

Model D, Sterling.....# doz. \$19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.

American Carpet Tacks.....90¢ 30¢

American Cut Tacks.....90¢ 30¢

Suedes Cat Tacks.....90¢ 30¢

Suedes Upholsterers.....90¢ 30¢

Gimp Tacks.....90¢ 30¢

Lace Tacks.....90¢ 30¢

Trimmers' Tacks.....90¢ 30¢

Looking Glass Tacks.....65¢

Bill Posters' and Railroad Tacks.....80¢ 20¢

Finishing Nails.....70¢

Trunk and Clout Nails.....80¢

NOTE—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10% is given on Light weights.**Miscellaneous—**

Double Pointed Tacks.....90¢ 30¢ or 5 tens

See also Nails, Wire.

Tanks, Oil and Gasoline—

Each

R. M. Co., Oil

Gal., Emerald

30 \$3.40

60 \$4.25

Queen City

30 \$3.65

60 \$4.50

Wilson & Friend Co., Oil

Gal., Gasoline

30 \$2.75

60 \$3.60

120 \$5.00

Tapes, Measuring—

American Asses' Skin.....50¢ 10¢

Patent Leather.....25¢ 50¢ 5¢

Steel.....\$3 73¢ 5¢

Chesterman's.....\$3 73¢ 5¢

Kaufel & Esser Co., 40¢ 10¢ 50¢

Favorite, Ass Skin.....40¢ 10¢ 50¢

Favorite, Duck and Leather.....25¢ 50¢ 10¢

Metallic and Steel, lower list, 35¢ 35¢; Pocket, 35¢ 35¢.

Lufkin's:

Asses' Skin.....40¢ 10¢ 50¢

Metallic.....30¢ 30¢ 5¢

Patent Bend, Leather.....25¢ 50¢ 10¢

Pocket.....40¢ 40¢ 5¢

Steel.....35¢ 35¢ 5¢

Wiebusch & Hilger:

Chesterman's Metallic, No. 34L, etc.....25¢

Chesterman's Steel, No. 1038L, etc.....35¢

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, 1/4-inch and larger... per 100 lbs. \$2.75 @ \$3.00

Thermometers—

Tin Case.....80¢ 10¢ 80¢ 10¢ 5¢

Ties, Bale—Steel Wire—

Single Loop.....80¢ 10¢ 5¢

Monitor, Cross Head, &c. 70¢ 24¢

Brick Ties—

Niagara Brick Ties.....25¢ 10¢

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

stamped, Japanned and Placed, sold very generally at net prices.

Tire Benders, Upsetters, &c.—

See Benders and Upsetters, Tire.

Tools—Coopers'—

L. & I. J. White.....20¢ 20¢ 45¢

Haying—

Myers' Hay Tools.....45¢

Stowell's Hay Carriers, 50¢ Hay Forks, 50¢; Fork Pulleys, 50¢.

Minature—

Smith & Hemenway Co.'s, Davidson.....25¢

Saw—

Atkins' Cross Cut Saw Tools.....35¢ 5¢

Simonds' Improved.....35¢ 5¢

Simonds' Crescent.....25¢

Ship—

L. & I. J. White.....35¢

Transom Lifters—

See Lifters, Transom.

Traps—Fly—

Balloon, Globe or Acme, doz. \$1.15 @ \$1.25; gro. \$11.50 @ \$12.00

Harper, Champion or Paragon, doz. \$1.25 @ \$1.40; gro. \$13.00 @ \$13.50

Game—

Imitation Oneida.....70¢ 10¢

Newhouse.....40¢ 10¢ 5¢

Hawley & Norton.....65¢

Victor.....70¢ 10¢

Oneida Community Jump.....90¢

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 12¢

Mouse, Round or Square Wire, doz. 85¢ 90¢

Marty French Rat and Mouse Traps (Genuine):

No. 1, Rat, # doz., \$13.25; case of 24 \$11.50 doz.

No. 3, Rat, # doz., \$6.50; case of 50 \$5.75 doz.

No. 3 1/2, Rat, # doz., \$5.25; case of 72 \$4.70 doz.

No. 4, Mouse, # doz., \$3.85; case of 150 \$3.00 doz.

No. 5, Mouse, # doz., \$3.00; case of 150 \$2.25 doz.

Trimmers, Spoke—

Wood's E 1.....50¢

Trowels—

Diaton Brick and Pointing.....25¢

Diaton Plastering.....20¢

Diaton "Standard Brand" and Garden Trowels.....30¢

Kohler's Steel Garden Trowels, # gro., 5 in., \$4.80; 6 in., \$6.00.

Never-Break Steel Garden Trowels.....# gro. \$6.00

Rose Brick and Plastering.....25¢ 5¢

Woodrough & McParlin, Plastering.....25¢

Trucks, Warehouse, &c.—

B. & L. Block Co.:

New York Pattern.....50¢ 10¢

Western Pattern.....60¢ 10¢

Handy Trucks.....# doz. \$15.00

Grocery.....# doz. \$15.00

Daisy Stove Trucks, Improved Pattern.....# doz. \$18.50

McKinney Trucks.....each \$10.00

Model Stove Trucks.....# doz. \$18.50

Tubs, Wash—

M'fgr's list, price per gross.

No. 0 1 2 3

Galvanized, \$63 \$76 \$83 \$96 10¢ 5¢

Galvanized Wash Tubs, R. L. M. Co., No. 1 2 3 10 20 30

Per doz., net \$5.70 \$6.30 \$7.20 \$6.00 \$7.30 \$8.10

Twine, Miscellaneous—

Plaz Twine:

No. 9, 1/4 and 1/2-lb. Balls, 23¢ 25¢

No. 12, 1/4 and 1/2-lb. Balls, 21¢ 22¢

No. 18, 1/4 and 1/2-lb. Balls, 18¢ 20¢

No. 24, 1/4 and 1/2-lb. Balls, 17¢ 19¢

No. 36, 1/4 and 1/2-lb. Balls, 16¢ 18¢

Chalk Line, Cotton 1/4-lb. Balls.....26¢ 31¢

Cotton Mops, 6, 9, 12 and 15 lb. to doz.....11¢ 19¢

Cotton Wrapping, 5 Balls to lb., according to quality.....15¢ 16¢ 23¢

American 2-Ply Hemp, 1/4 and 1/2-lb. Balls.....14¢ 15¢ 15¢

American 3-Ply Hemp, 1-lb. Balls.....15¢ 16¢ 16¢

India 2-Ply Hemp, 1/4 and 1/2-lb. Balls (Spring Twine), 10¢ 11¢ 11¢

India 3-Ply Hemp, 1-lb. Balls.....10¢ 11¢ 11¢

India 3-Ply Hemp, 1 1/2-lb. Balls.....10¢ 11¢

2, 3, 4 and 5-Ply Jute, 1-lb. Balls.....13¢ 14¢ 14¢

Mason Line, Linen, 1/4-lb. Balls, 37¢

No. 26 1/2 Mattress, 1/4 and 1/2-lb. Balls, according to quality.....30¢ 60¢

Wool, 3 to 6 ply.....B 3¢; A 10¢

Vises—

Solid Box.....50¢ 50¢ 10¢

Parallel—

Athol Machine Co.:

Standard Adjustable.....40¢

Amateur.....25¢

Columbian Hdw. Co.....40¢

Emmert Universal:

Pattern Makers' No. 1, \$15.00; No. 2, \$12.50.

Machinist and Tool Makers' No. 4A, \$12.50; No. 6A, \$10.00; No. 10A, \$22.50.

Presto Quick Acting, Adjustable Jaw, 25¢ 25¢ 10¢; Solid Jaw.....35¢ 35¢ 10¢

Tiger Machinists'.....40¢

Fisher & Norris Double Screw, net, each, Nos. 2, \$10.50; 3, \$16.00; 4, \$20.50; 5, \$27.00.

Fulton Mach. & Vise Co.:

Star, Solid Jaw.....40¢

Hollands:

Machinists'.....40¢ 40¢ 5¢

Keystone.....65¢ 65¢ 10¢

Adjustable Jaw.....30¢

Monarch, 50¢; Solid Jaw.....50¢

Massey Vise Co.:

Climber.....40¢

Perfect, 15¢; Lightning Grip.....15¢

Merrill's Vise Co.:

Miller Falls Oval Slide Pattern, 60¢ 10¢

Parker's:

Victor, 20¢ 25¢; Regulars.....20¢ 25¢

Vulcan's.....40¢ 45¢

Combination Pipe.....50¢ 60¢

Krohn's.....20¢ 25¢

Snediker's & L.....33¢

Stephens'.....33¢ 5¢

Saw Filers—

Diaton's D 3 Clamp and Guide, # doz., \$24.00, 30¢; Clamps.....30¢

Perfection Saw Clamps, # doz. \$4.50

Reading.....60¢

Westworth's Rubber Jaw, Nos. 1, 2 and 3.....50¢

Wood Workers—

Fulton Mach. & Vise Co.:

Reed.....25¢

Star.....40¢

Massey Vise Co.:

Lightning Grip, 15¢; Perfect.....15¢

Wyman & Gordon's Quick Action, 6 in., \$6.00; 9 in., \$7.00; 14 in., \$8.00.

Miscellaneous—

Holland's Combination Pipe, 60¢ 60¢ 5¢

Massey's Quick Action Pipe.....40¢

Parker's Combination Pipe, # 87 Series, 60¢; 187 Series, 80¢ 5¢; No. 870, 40¢.

Wads—Price per M.

B. E., 11 up.....60¢

B. E., 9 and 10.....70¢

B. E., 8.....80¢

B. E., 7.....80¢

P. E., 11 up.....1.25

P. E., 9 and 10.....1.50

P. E., 8.....1.50

P. E., 7.....1.50

Ely's B. E., 11 and larger \$1.70 @ 1.75

Ely's P. E., 11 to 20.....\$3.00 @ 3.25

Ware, Hollow—**Cast Iron, Hollow—**

3/4
d on
add
1 1/2¢

4@2¢

0.4107%
\$3;
0.4107%

@ 3¢

00&2

\$30.00

25.00

28.50

12-40.

.80%
£214
£714
£214

545%
£714
£214
75
721/2%

545%
£714
£214
1045
75%

£214%
£714%
base
base
.50%

545%
£214%
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\$2.50

4510%
4525%
ok,
4515%
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4045%
ude:
\$1.35

\$3.40
\$3.65
\$3.90
\$4.40
eport

545%
476%
4510%
4545%
4045%
4510%

1 Pipe,
Combi-

...50%
4045%
...40%
4545%
4545%

4545%
4545%
4045%
70%
\$6.25

only
\$6.25
\$3.00
\$1.75

law
\$2.10

...50%
...50%

...50%
...50%
...50%
...50%

Co.

gross
\$0.00

rch
net

vs--
weight-

fat net

\$9.10